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EAST INDIA (FAMINE CORRESPONDENCE).

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BETWEEN

THE SECRETARY OF STATE FOR INDIA AND THE GOVERNMENT OF INDIA,

ON THE SUBJECT OF

THE FAMINE IN WESTERN AND SOUTHERN INDIA.

Presented to both Houses of Parliament by Command of Her Majesty.

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293	Despatch No. 85 (Revenue).	22 Nov. -	Secretary of State -	Government of India -	Replying to No. 216. Arrangements concluded by the Viceroy for systematising the policy and strengthening the administration of State relief throughout the famine stricken districts of Madras appear to have been well calculated to secure the objects in view and meet with the appreciation of Her Majesty's Government.	278
294	Despatch No. 86 (Revenue).	22 Nov. -	Secretary of State -	Government of India -	Replying to No. 253 - -	279
295	Despatch No. 88 (Revenue).	29 Nov. -	Secretary of State -	Government of India -	Replying to No. 271 - -	279
296	Despatch No. 98 (Revenue).	27 Dec. -	Secretary of State -	Government of India -	Replying to No. 288 - -	280
297	Despatch No. 99 (Revenue).	27 Dec. -	Secretary of State -	Government of India -	Replying to No. 289 - -	281

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NOTE.—*This Return is a continuation of Part III., and contains letters of the Government of India subsequent to No.* 25 *of the* 4*th of June* 1877, *with their enclosures, and the Despatches of the Secretary of State in reply.*

The arrangement is chronological. It will be seen that the earlier correspondence herein contained is of prior date to some already published; this is explained by the marginal references. The documents in question form enclosures to letters which were not received when Part III. was prepared.

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CORRESPONDENCE.

No. 1. Encl. in No. 79.

EXTRACT from the PROCEEDINGS of the GOVERNMENT OF BOMBAY in the Public Works Department (Local), No. 268 C. W.—1,038, dated 13th December 1876.

READ again—

Government Resolution No. 186 C. W.—827 of 15th November 1876, and Government Resolution No. 206 C. W.—869 of 21st November 1876.

RESOLUTION.—Looking to the large and increasing number of people who, at this early period, have sought, and are seeking, relief on works, it seems probable that these works are rendered too attractive, either by the rate of wages to be earned upon them, or because from want of efficient superintendence, or from other causes, a proper amount of labour is not exacted from the persons who resort to them.

2. It is not the desire or intention of Government to render these relief works attractive; they have been commenced on the scale on which they are in progress, not because the Government desire to carry them on to so large an extent, but in order that they may afford an opportunity of earning wages to persons who are without means, and cannot elsewhere (owing to the absence of agricultural employment) find the means of procuring money, to enable them to purchase sufficient food to preserve themselves from starvation.

3. Government are most desirous that these works should be carried on in such a manner that, without pressing too hardly upon the people, and without requiring from them an amount of work which would over-strain in any way their physical powers, there should still be required of the persons who come upon relief works, a fair return for the aid which Government is making great sacrifices to afford them.

4. Government, in short, do not propose to afford gratuitous relief to those who can work, but expect a fair return for the present drain upon the treasury, and are also most solicitous not to pauperise the people by supporting them in idleness, or comparative idleness.

5. First as regards the rate of wages—

In accordance with orders already issued, the rates have been fixed at 2 annas a man, 1½ annas for a woman, and 1 anna for a boy or a girl old enough to be able to work, and a sliding scale has been authorsed, by which the rate of wages increases when the staple food-grain becomes dearer than 16 lbs. for a rupee.

6. Government have no desire to alter the principle of this arrangement, and, looking to the fact that in ordinary times a labourer can earn on works about 3 annas per diem, and to the prevailing price of food, the rates of wages fixed, though ample, are not excessive, and were intended to supply a reliable test of the need of the persons who accepted them. But Government consider that as the scale increases, as the price of grain rises above 16 lbs. for the rupee, so it should, to be consistent with the principle adopted, decrease when the price of grain falls much below that point.

7. In this view they are pleased to rule, that whenever the price of grain is not lower than 18 lbs. per rupee, the existing order shall remain in force; but in all cases when the price of grain is 18 lbs. or more for a rupee—

a man shall be paid at the rate of 1 anna + the value of ½ a seer of 80 tolas, or 1 lb. of grain;

a woman shall be paid at the rate of ½ an anna + the value of ½ a seer of 80 tolas, or 1 lb. of grain; and

a boy or girl employed on the works shall be paid at the rate of the value of ½ a seer of 80 tolas of grain; or, at the option of the directing officer, at the rate of ½ an anna + the value of ¼ seer of 80 tolas, or ½ a lb. of grain.

8. As regards superintendence—

Government fear that, in consequence of the sudden and great pressure that has come upon the District Officers, Civil and Public Works, they have not been able to arrange for efficient and trustworthy superintendence in sufficient quantity. The question is a most important one; unless there be a proper check and control, Government will not obtain the whole object they have in view; they may support the people who really require

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assistance, and may also be led into providing for persons who do not need support. There will be no security that the State will receive a proper return for the large expenditure it is incurring, and the people will suffer in their morale.

9. Immediate reports, should be made by Civil and Public Works Department Officers on the superintendence available, and it should be shown how the existing establishments are composed, what further aid is actually needed, not only to meet present, but to satisfy probable prospective wants, and how much is required on each considerable work and in each district. Collectors should be reminded that, under existing orders, they are empowered to place the Mamlatdar of each affected taluka on special duty as a Relief Mamlatdar, and to appoint a temporary Mamlatdar in his place, also that a Relief District Deputy Collector has been allowed for each seriously affected district.

10. On receipt of the reports regarding establishment now called for, Government will endeavour to make the necessary arrangements; the kind of assistance that will, in all probability, be chiefly needed will be that of intelligent persons capable of making and recording simple measurements, and who are to be trusted to disburse payments to workpeople.

Encl. in No. 51.

No. 2.

EXTRACTS from PROCEEDINGS of the GOVERNMENT OF MADRAS. 9th February 1877.

No. 245.—Read the following telegram from the Government of India, Department of Commerce, dated Calcutta, 26th January 1877:—

> Sir Richard Temple represents importance of not promising to the people remissions of land revenue, but only suspending the demand. We commend question to your notice in consultation with him.

Resolved that the following reply be despatched as a telegram:—

> No. 246.—" Yours 26th, about remissions of land revenue. Principle of assessment is a share of crop. Wet land, when crop is lost for want of water, receives remission by prescriptive custom. Dry land when crop is lost receives remission under special order of Board Revenue. To introduce now suspension where remission customary, would tend to check attempts at cultivation, which it is desirable to stimulate. Letter follows."

No. 247.—MINUTE by the Honourable SIR W. ROBINSON, K.C.S.I.

In dealing with this telegram we ought, I think, distinctly to state the broad principle of our land revenue demand under ryotwari settlement, viz., a right to a share of the crop of each field for the year in which it is grown, commuted into a money payment. No margin is allowed for extraordinary vicissitudes of season, and the demand is so heavy and searching that little room is left for the accumulation of agricultural capital to meet contingencies such as have overtaken the population. The proposal is, therefore, inconsistent with the principle of our settlement, and alike impolitic and impracticable in a season like this, when the crop has utterly failed, the cattle are perishing, and nothing remains to exact from the bulk of our poorer ryots in whose interest remission is being made.

The acreable demand on wet land is high throughout the presidency, averaging upwards of 5 rupees per acre. On dry land the demand is less, but averages upwards of 1 rupee per acre. The total is heavy, and in this presidency 30 millions pay about $4\frac{3}{4}$ millions sterling of land revenue; while 60 millions in Bengal pay, I understand, considerably less.

Under the principle of our settlement when the crop, whether wet or dry, is lost, there is nothing to share. The ryot has lost his labour, seed, and profits; the Government necessarily forego their demand against his unaided toil; thus remission, not postponement, is the unwritten and prescriptive law of the land when failure is so serious as to require abandonment of the State demand.

In the case of wet land, for which water—which Government is bound to supply—has failed, remission is absolute and of right. There is no crop to share, and the rent-charge is high, and water supply has not been maintained.

As regards dry land, the claim to remission is probably no less of right, but it is less completely conceded by Government, because the demand is, on the whole, lighter, and there is no guarantee in respect to needful water. Only when serious loss occurs in very bad years therefore, and under special orders, is remission for failure of dry crop

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conceded—such a season as the one we are passing through now—and circumstances render remission unavoidable on dry land where crop has wholly failed.

On these grounds I entirely dissent from Sir Richard Temple's proposals, as contrary to the principle of a ryotwari settlement and customary immemorial law of the country, and as being specially unjust under the circumstances of the season and of agricultural population at this time.

A season like the present one must, irrespective of the loss of seed, labour, and profits necessarily incurred, and of debt already contracted, plunge the whole population in pecuniary difficulty of no ordinary magnitude for the maintenance of life; and still further pecuniary demand is before the agriculturists to enable them to resume their agricultural operations, and obtain seed and cattle. To keep a debt of a million sterling and more hanging over their heads in the shape of suspended taxations will prove most disastrous to the well-being of the country, and must postpone its future restoration. I do not believe that in the long run it would be found possible to recover the suspended demand, and plenary remission must prove the final necessity. Why, in the meantime, hold so injurious a demand *in terrorem* over the country? The policy now pressed upon us by Sir Richard Temple is the objectionable practice of native zamindars, which so burdens the serfs they make of their cultivators—a policy which we take every opportunity of deprecating and, as opportunity (Court of Wards) occurs, of abrogating. Nothing has been more strongly deprecated and discouraged by our administration than the accumulation of arrears and State debts against our ryots, and this is specially a time for adhering to this policy.

It may not be out of place here to call attention to the enormous drain on the means of our people for mere subsistence which is going on at this moment, and promises before the end of our distress to assume gigantic proportions. The imports of food-grain in the single port of Madras amounted, during the six months between July and December 1876, to Rs. 1,45,00,000, against an average for the same six months of the previous three years of about Rs. 9,50,000. The exports of agricultural produce have, of course, fallen off very greatly, in respect to some articles ceased, and this import of food is being met from the small savings of the people. They will have spent millions on foreign food ere the country recovers; and I ask from whence is this suspended demand to be met?

31st January 1877. (Signed) W. ROBINSON.

ORDER thereon by the GOVERNMENT OF MADRAS, dated 9th February 1877, No. 575.

No. 248.—Ordered that the following letter be despatched to the Government of India:—

No. 576, dated Fort St. George, the 9th February 1877.

From the Secretary to the Government of Madras, to the Additional Secretary to the Government of India.

Referring to the telegrams marginally noted, arising out of a representation to the Government of India by Sir Richard Temple on the subject of remissions of land revenue which are being made in respect of the present famine, I am directed by his Grace the Governor in Council to submit the following additional observations.

From Government of India, dated 26th January 1877.
To Government of India, dated 2nd February 1877.

2. During the existence of the heavy assessments which prevailed in this presidency down to the time of Lord Harris's Government, and before the introduction of the revenue settlement now in progress, and which has already taken effect in five districts, and in considerable portions of four others—remissions were large and numerous, administered under a complicated system, and forming part of the annual and ordinary jamábandi. Under the revised assessment, it was anticipated that the necessity for making them would cease, except under rare and special circumstances. A district once settled—the following are the sole rules on the subject, viz.:—

(1.) *Wet land.*—Full remission when the land is left waste, or the crop totally lost owing either to deficiency or excess of water.

(2.) *Dry land.*—None; except in very exceptional circumstances of distress, and under the express sanction of the Board of Revenue in each case.

In regard to unsettled districts, the second rule applies to them also; but to wet lands in unsettled districts partial loss of crops entitles the occupant to partial remissions; the additional concession in favour of unsettled districts in this respect being based on

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the fact that the rates there are often high and unequal; and no allowance was made, in fixing them, for vicissitudes of season.

3. Taking the accounts of the fasli year ending 30th June 1875, it appears that the remissions under the first head came to Rs. 2,70,000 only, and were caused principally by disastrous floods in Nellore; and that those under the second head amounted to 1 lakh. Sundry small remissions of a miscellaneous character brought up the total to 4¾ lakhs, being about ¾ per cent. on the total assessment of ryotwari holding of Rs. 3,88,46,315. Such were the results of the system in an ordinary year.

4. With regard to the proposal to saddle the ryot with the sum that would now, under customary law, be remitted—the assessment on a crop which was never grown—as a debt to be paid by him in the following year—the Governor in Council is entirely opposed to the suggestion.

In the first place, as respects wet land, it is obvious that the Government is under an implied covenant to supply the necessary irrigation. In making the settlement, which proceeds in all cases on the basis of sharing the crop between the Government and the ryot, a certain allowance is made to the ryot for ordinary vicissitudes of season; and this being so, the full assessment is exacted even in bad years where the loss of crop is partial only; but where the water to be supplied fails altogether, the attempt at such exaction would be universally resisted as at variance with the bargain and a grave injustice.

2ndly. As regards dry lands, although, from the nature of the case, there is no similar implied covenant here, the objections to the policy of exacting the full assessment in a season like the present are manifold—

(*a.*) The Madras ryot is very heavily taxed; 5 rupees per acre for wet (single crop) and 1 rupee per acre for dry being his average assessment. Moreover, under other terminable settlements, the whole of the waste land is given up by Government for the term of thirty years—and under the zemindari settlement it is given up in perpetuity, in addition to the per-centage for the zemindar's commission. But in Madras, not only is every acre of waste liable to its full quota of tax, as soon as brought under cultivation, but there is no allowance whatever for fallow, or for land in a ryot's occupation which is *bonâ fide* set apart by him for the pasturage of his cattle. For instance, during the fasli year last reported on, as much as 2,134,110 acres with an average assessment of 15 annas, left waste by the ryots of this presidency out of their holdings chiefly for the purpose last mentioned, was fully charged against them, and fully collected.

(*b.*) Let the extent and nature of their holdings be considered. The number of leases is 2,392,064; of these 38,825 only are above 100 rupees, while upwards of one million and a quarter are below 10 rupees. The average extent of a holding is 8 acres, and the average assessment payable is 15 rupees, or thirty shillings sterling. How are two million peasant proprietors of this kind to pay sixty shillings apiece next year—after a season of unprecedented calamity, which, in addition to other sufferings and losses, has brought about already the destruction of a great portion of their cattle—and will cause the loss of many more? So far from supposing it possible to collect the assessment from the great body of impoverished ryots, the Government anticipate having to make considerable advances for the assistance of cultivators in the purchase of agricultural stock and seed grain.

(*c.*) It is, at all events, impossible to inaugurate any new system *per saltum* or without full and sufficient notice; and where such notice is given the ryot has at hand a procedure by which he can readily protect himself. By immemorial custom the Madras ryot is at liberty to readjust the extent of his holding within a certain day of each year, which day is selected with special reference to the monsoon on which his district principally depends for its rains. In Bellary, for instance, the south-west monsoon is looked for in the first week of June; and the ryot is allowed till the 15th of July to contract his holding. There can be no doubt that, if Bellary cultivators had foreseen that however bad the coming season, they would, sooner or later, be called upon to pay the full assessment on their holdings, those holdings would, in the vast majority of cases, have been contracted, and very many altogether relinquished. Nobody has anything to fear from competition, for his neighbours are as straitened as himself; and in this way the Government would be a far greater loser in direct collection of revenue than it is at present; would have many hundreds of thousands more on relief works; and would lose for the common good the produce of the cultivation which is still carried on. Many a reputable ryot, who is now digging a well and toiling on as best he may with the help of the village money-lender, would immediately fall into the utter destitution which characterises the great majority of his fellows; he will not try to help himself, if his possible failure is to be followed by the swift and inexorable demands of the State

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for the full assessment of his land; nor would any sane money-lender advance him a loan in such circumstances.

5. His Grace in Council trusts that in the foregoing remarks he has demonstrated the utter impossibility in part, and the inexpediency in all, of attempting to vary the usual undertaking and custom by substituting, suddenly and without notice, suspension for remission of revenue in a specially disastrous season. He would, however, point in conclusion to the large figures yielded by the land revenue of Madras—the highest in any part of India—and to its annually steady increase. He believes that its management is thoroughly well in hand by those to whom the system pursued has long been familiar; and that the wholesale innovation proposed had nothing to recommend it, except that it would retain apparently to the credit of Government a claim which would never be realised. It is as incompatible, in his opinion, with justice to the ryot as with the prosperity of the general revenues of the presidency; not only the land revenue but that under every other head—Salt, Stamps, Abkari—rises or falls with the condition of the ryot, and of the vast agricultural and mercantile populations linked with his interests.

6. The people, it has been shown, can protect themselves by relinquishing their lands in bad years, and would certainly in self defence do so, if the unusual course proposed by Sir Richard Temple were adopted. Such action on the part of the ryots would be alike injurious to themselves and to the State; and his Grace the Governor in Council trusts that valid reasons have been advanced for making no change in the ordinary practice, which has always been observed in this presidency, of granting remission of the Government revenue on the occurrence of disastrous seasons.

7. A copy of this correspondence will be furnished for the information of the Secretary of State.

No. 3.

Encl. in No. 51.

No. 1, dated Fort St. George, 10th February 1877.

From the Government of Madras to Her Majesty's Secretary of State.

We have the honour to submit for your Lordship's information copies of a recent correspondence* with the Government of India, arising out of a suggestion made by Sir Richard Temple on the subject of remissions of land revenue which are being made in respect of the present famine.

* Proceedings of Government, 9th February 1877, Nos. 245 to 249.

No. 4.

Encl. in No. 51.

Revenue Department.

Proceedings of the Board of Revenue, Madras, dated 1st March 1877.

In separate proceedings the Board have passed orders on the recommendations of the several Collectors as to the remissions to be granted in the present season; but the amount of revenue at stake being, in the unfortunate circumstancas of the present season, enormous, they deem it necessary to issue the following general instructions for the guidance of settling officers at the approaching Jamábandi.

2. The demands for remission in the current year will be so great that the Board fear that sufficient scrutiny of them will be very difficult. Great care will have to be exercised in checking the disposition of tahsildars and subordinate revenue officers to recommend wholesale remissions. Nunjah remissions should be dealt with strictly according to the remission rules. As to punjah remissions, none should be granted where one crop of any kind has been obtained, even though it be not the principal crop of the year. In the southern districts, especially, a large extent of land has yielded a crop, though possibly one below the average, under the early rains, and the prices commanded by agricultural produce are now so great that a single crop of the kind will enable the ryots to pay the assessment on their lands as easily as in ordinary years. Per-centage remissions for partial failure of crop have been sanctioned on the Collector's recommendations in some districts; but it is the Board's desire that the rates named should always be considered as maxima and not to be granted as a matter of course. The rates must be adjusted by the settling officers to the condition of the country and the circumstances necessitating indulgence to the people; and it must be remembered

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that in settled districts a large reduction is already made to allow for vicissitudes of season. No remission should be granted when the crops have yielded 6 annas or upwards, *i.e.*, half or more than half of an average crop. The principle of dealing with claims with reference to whole villages, groups of villages, or tracts, must be carefully carried out. As regards *punjah waste*, care must be taken to exclude from remission lands usually left waste for pasture and other purposes which are known in some districts as mamool waste.

3. Collectors are requested to furnish to the Board, as soon as possible after the Jamábandi of each taluk is finished and in advance of the settlement report, a brief report showing the amount of remission for waste, shavi, and partial loss in dry and wet lands respectively in the taluk, with any remarks which the Collectors or settling officers may see fit to record; and to note in the reports, for comparison, the average remission granted in the three previous faslis. In these reports occasional remissions only should be given.

Encl. in No. 51.

No. 5.

Telegram dated 18th March 1877.

From Sir R. Temple, Sholapore, to Revenue Additional Secretary, Calcutta.

The Madras Government were asked to decide question of remission of revenue after consulting with me. I have never been able to submit a proper opinion without seeing the papers. I should be obliged if the Madras Government were instructed to let me see the papers necessary for understanding the case. It is quite understood that the local Government is to decide question of remission or suspension at its discretion. Papers which I desire to see are Revenue Board orders on each district regarding remissions.

Encl. in No. 51.

No. 6.

Telegram dated 21st March 1877.

From Revenue Additional Secretary, Calcutta, to Revenue Additional Secretary, Madras.

Sir Richard Temple telegraphs as follows :—

"The Madras Government were asked to decide question of remission of revenue after consulting with me. I have never been able to submit a proper opinion without seeing the papers. I should be obliged if the Madras Government were instructed to let me see the papers necessary for understanding the case. It is quite understood that the local Government is to decide question of remission at its discretion. Papers which I desire to see are Revenue Board orders on each district regarding remissions."

Message ends.

The Government of India will be obliged by his being supplied with desired information.

Encl. in No. 51.

No. 7.

Telegram dated 23rd March 1877.

From Revenue Additional Secretary, Calcutta, to Sir R. Temple, Sholapur.

Your telegrams of 18th to me and 21st to Strachey. The former was repeated on 21st to Madras with request to supply desired information.

Encl. in No. 60.

No. 8.

Extract from the Proceedings of the Government of India, Financial Department, No. 1,826, dated 28th March 1877.

Read—

A letter from the Government of Madras, No. 213, dated the 22nd January 1877, requesting that a special assignment of funds may be made to Provincial Services

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for gaols to meet the extraordinary expenditure anticipated in 1877–78 owing to the high prices and distress prevailing in the Madras Presidency, and the consequent increase of crime.

Resolution.—The Governor-General in Council observes that, as the provincial allotments are consolidated, no addition thereto can be made on the ground of the alleged insufficiency of any particular item used in the calculation upon which they were based.

2. When the Bengal famine occurred, the local Government was required to exhaust its entire resources, provincial and local, in contending against the calamity, and the same course should now be followed in the Madras and Bombay Presidencies.

3. To save the Government of Bengal from actual insolvency, such a contribution was eventually made from Imperial Revenues as left it after the famine with a net balance of five lakhs of rupees at credit of its Provincial Funds and the Local Funds at its disposal for provincial purposes together. His Excellency in Council will be prepared to treat the Governments of Madras and Bombay hereafter in the same way.

Ordered,—that this Resolution be communicated to the Revenue Department, the Governments of Madras and Bombay, to the Accountants-General in those presidencies, and to the Comptroller-General, for information and guidance.

No. 351, dated Simla, 11th April 1877.

Endorsed by the Department of Revenue, Agriculture, and Commerce.

Copy forwarded to the Home Department for information.

No. 352.

Copy forwarded to the Secretary to Sir R. Temple for his Honour's information.

No. 9. Encl. in No. 51.

Telegram dated 8th April 1877.

From Sir Richard Temple to Viceroy.

Mr. Hope's message of 23rd March told me Madras Government was instructed to furnish me copies of Revenue Board's orders regarding land revenue remissions; thereupon I asked repeatedly for those papers without obtaining either answer or papers; to-day I learn that Madras Government object to furnish papers, and are submitting letter to Government of India on subject; my object in asking for these papers is to master present state of question. I fully understand decision that local Government is to settle remission question, but I might press locally for economy within lines laid down by Madras Government, and I should be able to submit general question in shape for enunciation of rule for guidance in future famines. My time is drawing very short, I solicit that decision may be communicated by telegraph. If Government of India decides I shall have papers, a message might go to Madras accordingly. Unless telegraphic orders issue, I shall not have time to do anything. In either case I would solicit to be informed. The papers could be kept quite confidential for the present.

No. 10. Encl. in No. 51.

Telegram dated 9th April 1877.

From Viceroy to Governor, Madras.

The Government of India learn from Temple that Madras Government object to furnish him with the papers referred to in our telegram of 21st March. The Government of India think it very desirable that Temple should be furnished with these papers in order that he may be enabled to state his views fully. There is no intention of interfering with the discretion of local Government regarding remissions on present occasion, but a full discussion of the subject may be useful for future famines. The discussion can be treated as confidential for the present if the Madras Government desire. It seems due to Temple that his request should be complied with, and we trust that your Grace's Government will waive this objection.

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Encl. in No. 51.

No. 11.

No. 1,382, dated Fort St. George, 10th April 1877.

From the Officiating Chief Secretary to the Government of Madras to the Additional Secretary to the Government of India.

I am directed to reply to your telegram dated 21st ultimo. It communicates copy of a telegram received by you from Sir R. Temple, in which he states that this Government were asked to decide the question of remissions after consulting him; that in view to his understanding the question it is necessary for him to see all the orders that have been issued by the Madras Board of Revenue on each famine district; and he accordingly suggests that this Government may be instructed to supply him with such papers. The Government of India, you state, will be obliged by a compliance with Sir R. Temple's wishes.

2. Although Sir R. Temple does not mention it, it should be stated that when addressing you he had already received a communication from this Government declining to afford him the papers required, on the ground that the case was fully concluded by the terms of the Government of India Despatch to the Secretary of State, published at page 199 of the supplement to the "Gazette of India" of the current year; and to this opinion his Grace the Governor in Council continues to adhere.

3. It is desirable to trace the course which the correspondence on this question has taken.

It will be admitted that it was no part of Sir R. Temple's original commission, the objects of which are laid down in the Despatch marginally noted. It appears, however, that shortly after entering upon his duties in this presidency Sir R. Temple represented to the Government of India the importance of not promising to the people remissions of land revenue but only suspending the demand, and in their telegram to this Government, dated 26th January, the Government of India remark—"We commend question to your notice in consultation with Sir R. Temple." In reply the Government of Madras strongly deprecated the proposed reversal of policy, both by telegram* and by letter†. To the telegram the Government of India replied by a telegram dated 7th idem, viz. —"Your telegram of 2nd. The Government of India merely commend Sir. R. Temple's "suggestion to your consideration"—no longer it is observed in consultation with him— "but will not interfere with the discretion of the local Government in a question of "this kind;" and to the latter they replied by referring his Grace in Council to the answer conveyed in the telegram. When it is added that these communications were immediately followed up by the Despatch to the Secretary of State, already referred to as having been published in the "Gazette of India," in which, besides repeating their decision that the matter must be left to the discretion of this Government, the Government of India go much further and say—"We have now only to observe that the Madras Government have "shown good reasons for the opinions which they so strongly hold"—it is impossible to conceive a case in which further discussion is more inadmissible than the present one.

From Government of India to Secretary of State, No. 2, dated 12th January 1877.

* Dated 2nd February.

† Dated 9th February.

From Government of India, dated 17th February 1877, No. 201.

4. If after a decision deliberately passed in communication with the Government of Madras the Governor-General in Council thinks proper to reopen the question as regards future years, his Grace the Governor in Council will be prepared to discuss it again with the Government of India; but as regards the present year the case is absolutely concluded.

5. A copy of this letter will be submitted for the information of the Secretary of State.

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No. 12.

Encl. in No. 51.

Telegram dated 17th April 1877.

From Sir R. Temple, Arcot, to Revenue Additional Secretary, Simla.

Having learnt from Viceroy that Madras Government were instructed to give me the land revenue remission papers, I asked for them. Madras has again declined to furnish them pending answer to their official reference. Unless they obey orders of Government of India to send papers now, there will be no time for me to make a report, but I can do so afterwards whenever papers received.

No. 13.

Encl. in No. 60.

No., 1914, dated Bombay Castle, the 17th April 1877.

From the Chief Secretary to the Government of Bombay to Secretary to the Government of India, Financial Department.

I am directed by his Excellency the Governor in Council to acknowledge the receipt of the Resolution of the Government of India, No. 1,826, dated 28th ultimo, regarding the appropriation of the Provincial and Local Funds towards the expenses incurred in consequence of the famine.

2. His Excellency the Governor in Council observes that the balance to the credit of the Provincial Funds at the close of 1876–77 amounts to Rs. 7,41,854, and if, out of that amount, the sum apparently contemplated by the Government of India, viz., Rs. 5,00,000, be reserved to meet Provincial and Local charges, the sum which will be hereafter available for the final settlement of famine advances will amount to Rs. 2,41,854.

3. It will at the same time be for consideration what proportion of the reserved balance of Rs. 5,00,000 must be assigned to those Local Committees whose funds will have been exhausted; but his Excellency in Council takes it for granted that no claim can be made on the Local Funds of districts in which no famine charges have been incurred, as he considers that such a proceeding will be altogether at variance with the spirit of the Local Funds Act.

4. His Excellency in Council feels it his duty to point out that by thus complying, when the time comes, with the present orders of the Government of India, the Provincial balance of the presidency will be reduced much below the amount which the Government of India have declared to be necessary, and that it has never been found practicable up to the present time to provide for the annual charges without drawing on the balance, although this Government have endeavoured to be as economical as possible. Provincial taxation appears therefore to be inevitable.

5. Looking, however, to the figures for 1877–78, I am to state that a large portion of the balance referred to in paragraph 2 has been appropriated towards the expenditure estimated for the current year, and the balance estimated to the credit of the Provincial Services at the end of the current year thus amounts to Rs. 5,62,555. His Excellency in Council does not think that any saving is possible, as this Government are not commencing a single new public work beyond the petty ones included in the Minor Works grant. Reserving, therefore, Rs. 5,00,000 out of this balance, the amount available towards the famine charges will amount to about Rs. 62,000.

No. 14.

Encl. in No. 51.

Telegram dated 20th April 1877.

From Revenue Additional Secretary, Simla, to Revenue Additional Secretary, Madras.

Your letter of 10th instant, number 1,382, has been received and considered. The Governor-General in Council decides that Sir Richard Temple ought to see the papers.

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Encl. in No. 51.

No. 15.

Telegram dated 25th April 1877.

From Revenue Additional Secretary, Madras, to Revenue Additional Secretary, Simla.

According to desire of the Governor-General in Council, expressed in your cypher message dated 20th (in) reply to my letter of the 20th instant, copy (of) papers required will be sent for Sir Richard Temple's information.

Encl. in No. 51.

No. 16.

No. 1,556, dated Fort St. George, 25th April 1877.

From the Officiating Chief Secretary to Government of Fort St. George, Revenue Department, to the Additional Secretary to the Government of India.

Referring to my cypher telegram of this date I have the honour to confirm the same in writing, viz., that, agreeably to the instructions of the Government of India on my letter of 10th April instant, No. 1,382, the several orders marginally noted have been furnished for Sir Richard Temple's information direct to save the delay in transmitting them, in the more regular way, to the Government of India.

The correspondence will be reported to the Secretary of State.

G. O.,	16th	Nov.	1876,	No.	1695.	G. O., 23rd Feb. 1877, No.	798.
„	27th	„	„	„	1810.	„ 9th Mar. „ „	995.
„	17th	Jan.	1877,	„	188.	„ 10th „ „ „	1016.
„	23rd	„	„	„	313.	„ 12th „ „ „	1035.
„	10th	Feb.	„	„	607.	„ 19th „ „ „	1137.
„	13th	„	„	„	653.	„ 19th „ „ „	1138.
„	13th	„	„	„	654.	„ 20th „ „ „	1157.
„	13th	„	„	„	655.	„ 22nd „ „ „	1189.
„	13th	„	„	„	657.	„ 28th „ „ „	1255.
„	13th	„	„	„	665.	„ 3rd April „ „	1295.
„	13th	„	„	„	666.	„ 3rd „ „ „	1296.
„	15th	„	„	„	693.	„ 4th „ „ „	1323.
„	19th	„	„	„	743.	„ 19th „ „ „	1481.
„	19th	„	„	„	748.		

Encl. in No. 51.

No. 17.

No. CXVII.—Memorandum by Mr. C. E. Bernard, Secretary to Sir Richard Temple, regarding the Remissions of Land Revenue in consequence of the failure of Harvests in 1876, Nagpur, April 28, 1877.

One of the very first points which attracted the attention of Sir Richard Temple on his mission to the famine districts in January last, was the apparent disposition of revenue officers in Madras and Bombay to remit so much of the land revenue as could not fairly be collected this season from the ryots, who had lost their crops in consequence of the drought. It was understood that the higher revenue authorities of Madras and Bombay were opposed to the system of suspending (that is, postponing to future good years the collection of) any of the land revenue that the ryots could not be fairly called upon to pay this year.

2. In permanently settled Bengal it had been the almost unvarying rule not to remit or suspend any land revenue in consequence of vicissitudes of season. In provinces of the Bengal Presidency, where the land revenue was settled for a term of years only, such as Orissa, the North-West Provinces, and the Punjab, it had been usual to grant certain suspensions (postponements of the collection) of land revenue in the most affected tract. In subsequent years the greater part of the suspended demand was collected; but some small* part was remitted in extreme cases.

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* It may be well to adduce figures in support of the statement that in other parts of India it is customary to grant remission of land revenue very sparingly even in cases of very great failure of the crops. For the earlier famines, the records are not very clear, but so far as I can ascertain the subjoined figures are correct:—

	Total land revenue remitted.	Total land revenue demand of the afflicted area.
North-West Provinces famine of 1803 -	30 lakhs (approximate)	156 lakhs.
North-West Provinces famine of 1837–38 -	90 lakhs	350 „
North-West Provinces and Punjab famine of 1860.	10 „	420 „
Bengal and Behar famine of 1866 - -	0 „	240 „
(The figures for Orissa are not now accessible to me.)		
North-West Provinces famine of 1869 -	2¼ lakhs	128 „
Central Provinces famine of 1869 - -	—	30 „
Behar and Bengal famine of 1874 - -	—	300 „

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3. Sir Richard Temple drew the attention of the Government of India to this matter, and recommended that no remissions of land revenue should, for the present, be made or promised; but that the land revenue demand shonld be suspended whenever necessary; it being left for future decision how much of the suspended demand ought to be finally remitted, and how much might be properly collected from the ryots. The Government of India, after consulting the Governments of Madras and Bombay, decided that the matter should be left to the discretion of the local Governments.

4. In the exercise of this discretion the Bombay Government has arranged that its Collectors should distribute the land revenue arrears of the present year under the two heads of "to be remitted" and "to be suspended," hoping that, if the next two seasons are favourable, a part, at least, of the "suspended" revenue may be collected. It will probably turn out that less than 30 lakhs will be remitted out of a total land revenue demand of 115 lakhs in the distressed districts of Bombay.

5. The Madras Government, on the other hand, held that it was inexpedient to vary the usual custom, and to substitute suspension for remission of revenue in a disastrous season like that which has just passed. The Board of Revenue estimated that the remissions of land revenue, to be made on account of the recent failure of crops, would reach 143 lakhs of rupees (1,430,000*l.*). The total (ryotwari) land revenue of the twelve districts affected by the drought is 192 lakhs. No remissions are proposed for permanently settled (zemindari) estates, the land revenue on which is distinct from the ryotwari land revenue. But the Board, in reviewing the remission proposals submitted from each district, and in their circular order of the 1st March, have inculcated great care in granting remission. In some districts the Collectors have postponed the jamábandi (that is, the verification of holdings and apportionment of remissions) in case the May showers might restore hope and credit to the ryots; and perhaps the actual remissions finally made may fall short of the Board's estimate. Possibly the discussion which has taken place may help revenue authorities to be firm in realising as much of the Government dues as can fairly be collected.

6. But the question has an important bearing on the finance of future famines, and it would be well that it should be considered how far the practice of the Madras Government, in regard to remissions of revenue, should be held as a precedent for the guidance of revenue authorities in future famines.

7. Before considering the reasons for or against the decision taken by the Madras Government in the present case, it may be well to review very briefly some of the statistics of and the system of the Madras revenue administration.

8. The land revenue of Madras is derived from three distinct sources, namely:—

		Rs.
Permanently settled quit rent and zemindari estates paying about		69,00,000
Irrigated lands paying land revenue at "wet" rates, about -		1,70,00,000
Lands which are unirrigated, or are irrigated only from wells, paying at "dry" rates about - - - - -		1,69,00,000
Total - -		4,08,00,000
Add for the two unmeasured West Coast districts -	30,70,000	
Ditto miscellaneous land revenue items -	26,50,000	
		57,20,000
Grand Total - -		4,65,20,000
Deduct averarge remissions granted in ordinary years - -		12,00,000
Average land revenue of a good year for the Madras Presidency, or say 4½ millions sterling.		4,52,20,000

I do not lay much stress on the precedent set by permanently settled Bengal, where the land revenue bears a comparatively small proportion to the rental or the produce of the land. But the example of the North-West Provinces and the Punjab is surely to the purpose; for the land revenue there presses at least as hardly on the land as it does under present arrangements in Madras, and further, the profits of the land have in some cases to be divided among two or more sets of rightholders, instead of going straight into the pockets of the ryot (peasant proprietor) as they do in Madras.

It is noteworthy that, though in 1837–38 considerable remissions had to be given, yet the great improvement in the condition of the landed classes during the last 40 years has enabled them to make good from the surplus of favourable seasons the arrears of land revenue due on account of occasional years of drought and failure of harvest.

The figures in this note are taken from Geddes' "Famine Experiences" and from Girdlestone's "Past Famines of the N. W. P."

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9. Over a part of the Madras Presidency (about nine districts out of the 21 which compose the presidency) the land revenue has been settled for 30 years. Under this settlement the land has been surveyed; holdings have been demarcated and mapped; the incidence of the land revenue has been made much more equable; the Government has engaged not to demand land revenue at the settlement rates only for 30 years. But the ryot (or peasant proprietor) has not bound himself to pay the revenue for 30 years; he can, even in the settled districts, throw up his land when he likes. In the districts to which the 30 years' settlement of the land revenue has not been extended, the ryots theoretically are liable to have their land revenue altered from year to year. But practically, they are just as secure as their brethren in the settled districts. They can and do sell or mortgage their holdings; and their title as peasant proprietor is almost as good as a ryot's title in the settled districts. The land revenue in parts of these districts used formerly to press unequally, and in some cases it was heavy and the people were poor. But during the last 15 years the position of the Madras ryot, even in the districts which are not settled for 30 years, has very greatly improved; the revenue rates are fair and equable; the high rates of Rs. 27 or Rs. 30 per acre have disappeared, and generally speaking the land revenue demand presses nearly as equally in the unsettled as in the settled districts.

10. In both the settled and the unsettled districts the land revenue on ryotwari lands is separated into—

(*a.*) The demand from "dry" or unirrigated lands;

(*b.*) The demand from "wet" or irrigated lands.

The demand on "wet" lands includes the revenue from the land, and also the rent for the water which Government supplies for irrigating the land. In two districts the land revenue is kept apart and distinct from the water-rent, but over the rest of the presidency the land revenue and water-rent are assessed together, and the one is not kept distinct from the other. Land which is fertilised by rain water only, or which is irrigated from wells, pays land revenue at "dry" rates. The concession whereby land irrigated from wells is assessed to land revenue at "dry" rates was granted about 15 years ago. Since then the number of irrigation wells has greatly increased; and in this respect the petty proprietors of Madras have a great advantage over their fellow subjects in most other parts of India, where land watered from wells is reckoned, and is assessed to land revenue, as "irrigated" land.

11. It was mentioned in paragraph 8 (above) that a certain proportion of the land revenue (averaging in good years about 12 lakhs of rupees per annum) is remitted on account of failure of harvest. There is some slight difference in the rules under which remissions of land revenue on "wet" lands are granted in the settled districts, as compared with the rules for districts where a 30 years' settlement of the land revenue rates has not been made. In districts of both classes the full land revenue is remitted on "wet" lands whereon the crop may have been totally lost owing to deficiency or excess of water. But in the settled districts no remission is granted for the partial loss of "wet" crops, whereas in districts where a long term settlement of the land revenue rates has not been made, partial remission is granted for partial failure of "wet" crops. The Madras revenue rules provide that on "dry" lands no remission of assessment shall be granted save "in very exceptional years and under very exceptional circumstances."

12. The manner in which remission of land revenue, when sanctioned, reaches the landholders of Madras differs from the practice of other parts of India. A certain percentage of remission (say 25 or 50 per cent. on the demand) is sanctioned for either the "dry" or the "wet" lands of a whole tract, and thereupon all the lands ("dry" or "wet" as the case may be) of that tract enjoy the sanctioned remission in full, quite irrespective of the excellent yield the ryots of that tract may have had in a year of high prices on their other lands, or by means of irrigation from wells. Obviously a ryot*

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* It has been occasionally said that a Madras ryot does not ordinarily hold "wet" and "dry" land together, and that while one ryot's holding is all "wet," another's is all "dry." This may be the case in Bellary, where the "wet" lands are so very small, barely 6 per cent. of the cultivated area. But in other districts outside the river deltas it is, I am told, common for a ryot to hold some "wet" and some "dry" land, or to have a part of his "dry" land irrigated from wells. At any rate, I see that Mr. Dalyell, at paragraph 71 of his Famine Memoir of 1866, takes a representative Madras ryot as holding 6 acres of "dry" land and 2 acres of "wet" land, or 8 acres in all.

† It ought, perhaps, to be explained that "jamábandi" is the name given to certain operations conducted by a Madras Collector and his establishment every year. When the sowings are done, the village officers compile returns showing all the lands cultivated by each ryot. When the crops are reaped, additional entries are made to these returns, showing what crops may have failed, and why. The taluk revenue officials then test these papers, and report how much land ("wet" or "dry") each ryot has cultivated, and what land revenue he has paid and still has to pay. These returns are then tested on the spot by the Collector or his Assistants in the

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with 2 acres of "wet" land and 4 acres of "dry" land may often have a bumper crop on his "dry" lands, while his "wet" crop is lost by reason of flood or from the bursting of the neighbouring tank. On the other hand his "wet" land may have yielded a capital crop, while his "dry" crop has failed by reason of the shortness of the early rain (south-west monsoon).

13. It is not necessary to explain here the reasons which have guided the Madras authorities in adopting this rule of practice. The existence of the rules is mentioned because it operates to make remissions, when granted, wider and more sweeping in Madras than in other parts of India.

14. As it has never been the practice in Madras to grant suspensions of the land revenue, so it follows that all the land revenue which is not remitted at the jamábandi† (attestations of holdings) of each year, is leviable and practically is collected immediately. Processes for the collection of the unremitted arrears issue at once, and, theoretically, the ryot has no opportunity to make the land revenue arrears of a bad year from the surplus profits of a good year. In other parts of India it is held to be fairer to the public treasury, and to be in some respects better for the landed classes, to suspend the greater part of the land revenue in a year for extreme drought, and to let the landholders make good the arrears from the surplus profits of future years.

NOTE.—*See* Mr. Muir's proposed sliding scale for suspensions, according to the severity of the drought, at pages 103, 104 of Girdlestone's "Past Famines."

15. The grounds on which it was held inexpedient to suspend instead of remitting such portion of the Madras land revenue as could not be fairly collected during the present famine year, were set forth in the Honourable Sir William Robinson's Minute of the 31st January, and in Mr. Secretary Carmichael's letter No. 576, dated the 9th February 1877. It does not appear that the Revenue Board have recorded an opinion on the matter. These reasons are, in brief,—

(1.) The Government is under an implied obligation to supply water for irrigating "wet" lands; and if Government fails so to supply the necessary water, it cannot demand, either now or in future years, any land revenue in respect of lands which by reason of failure of irrigation have yielded no crop.

(2.) The theory of the land revenue in Madras is that the State share the produce of the land with the ryot, though the State share has been commuted for a cash payment; and, if there be no produce on the land, then there is nothing for the State to share, and it must forego its land revenue.

(3.) The Madras ryot is heavily taxed, and he has ordinarily no accumulations or surplus wherefrom to make good the land revenue due for a year of extreme drought.

(4.) Most of the Madras ryots have very small holdings, and so they could not pay the arrears of one year out of the surplus of the next. Moreover, they could, and probably would, throw up their holdings if they were called upon to pay the arrears due on account of a year of drought.

16. In regard to the first point, namely, the implied contract in respect of "wet" lands, it seems fair that, if no water is supplied for irrigation, the share of the land revenue which is reckoned as water-rent should be remitted. But it does not necessarily follow that the share of the land revenue debitable to the land should also be remitted. In other parts of India the canal revenue is remitted on lands which the canal water may have failed to reach; but the land revenue on such lands is usually collected as a matter of course. For instance, the land revenue of the North-Western Provinces falls on the average at about $1\frac{3}{4}$ rupees per acre; while the canal revenue falls at an average of $3\frac{1}{8}$ rupees per acre. If the canal water fails, the canal rent is remitted; but the land revenue is payable and is generally paid all the same.

17. But it was in regard to the remission of land revenue due in respect of "dry" lands that Sir Richard Temple specially made representation. The remissions on the "wet" assessment will hardly reach 50 lakhs out of the total of 143 lakhs to be remitted

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presence of the villagers interested. At the time of this attestation the Collector or his Assistants decides finally what remissions of revenue are to be given under the rules or under any special orders for the year; he hears all protests against the entries made in the papers, and decides such questions as may arise thereon. The questions so arising generally refer to ryots having cultivated lands to which they were not entitled; to ryots having encroached on their neighbours; to ryots having failed formally to surrender their lands; to the extent of loss suffered by failure of water in tanks or rivers. All this business has to be done in the fullest detail every year in every district, whether it has come under regular settlement or not.

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under the Board's estimate. Happily the irrigation of the delta country in the Tanjore, Tinnevelly, South Arcot, Godavery, Kistna, and Nellore districts was little affected by the drought of the past year.

18. The second argument is, that the land revenue is merely the State share of the produce, and that when there is no produce, there can be no State share therein, and consequently no land revenue. Doubtless, the principle that the State is entitled to a share of the produce of the land, underlies the land revenue system of India as of other countries. But in Madras, as in other parts of India, affairs have passed beyond the primitive stage when Government officials stepped in after each harvest and carried off an appointed share of the produce of each field. The theory of the Madras settlement and the rules of the Madras Revenue Board do not altogether proceed upon the principle which has just been recited. The settlement officers deduct 20 per cent. from the estimated value of the average produce before they assess the money value of the State share in the produce; and the settlement rules set forth that this deduction is made to meet losses caused by vicissitudes of season. The Board's rules provide also that no remissions shall be granted on "wet" lands on account of partial failure of crops in settled districts; and that no remission at all shall be granted on account of failure of "dry" crops, save under very exceptional circumstances.

It appears then, that in Madras, as in other parts of India, the principle which underlies the land revenue system, is not ordinarily pushed to its logical conclusion; and, indeed, it would seem to be in practice but little observed. It appears questionable, therefore, whether this principle need in a famine year be held to bind the Government to remit all, or nearly all, its revenue on drought-stricken lands.

19. The next argument is, that the Madras ryot is heavily taxed, and that the heavy land revenue he has to pay leaves him in good years little margin wherewith to pay the arrears due for a year of failure. The severity or the lightness of any taxation is after all comparative; and all we can do is to compare the incidence of the land-tax in Madras with its incidence in other parts of India, and with the productive power of the land in Madras. The amalgamation of the water-rent with the land revenue into a single "wet" assessment rate, makes it somewhat difficult to compare the incidence of the Madras land revenue with other parts of India. Moreover, detailed statistics of Madras districts exist only for the ryotwari tracts; so that it is not possible to ascertain the incidence of the land revenue per acre for the whole presidency. The pressure of the land tax on a country or population must be gauged, not only by the rate per acre, but also by the rate per head of the population. For the margin of profit per acre to the farmer may be larger on the rich irrigated lands of Tinnevelly and Cuddapah paying Rs. 9 and Rs. 7 an acre, than on the light "dry" lands of Bellary, paying an average of 10 annas per acre. Similarly, the Gujarat ryot, who pays an average of Rs. 2¼ an acre land revenue, is a richer man than the Sholápur ryot, who pays on the average only 10 annas per acre. Matters in this respect are often nearly equalised by the much larger size of holdings in poor soils; for instance, an average ryot's holding is 24 acres in the Nágpur country, while it is 4 or 5 acres in the rich delta lands of Lower Bengal.

20. Figures for instituting a comparison between the incidence of the land-tax are available from published reports. According to these figures* the incidence of the land-tax in six temporarily settled provinces in the Empire may be compared thus:—

	Incidence of Land Revenue per acre of cultivated land.		Incidence of Land Tax per head of the Total Population.
	Rs.		Rs.
Madras, including water-rent	1·75	on Ryotwari lands only.	1·4
„ excluding water-rent	1·1		1·03
North-West Provinces, including water-rent	1·88		1·44
„ „ excluding water-rent	1·72		1·32
Oudh	1·8		1·3
Bombay (including Sind)	1·17		1·72
British Burmah	3·0		2·55
Punjab	1·38		1·14

* *See* appended note, which gives in detail the authorities for the figures offered in this paragraph. If the results here offered cause surprise, it is solicited that the authorities cited may be consulted before the deductions made in this paragraph are rejected.

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21. It will be seen that even though the State has provided artificial irrigation for 4,000,000 of acres in Madras, as against 1,100,000 acres in the North-West Provinces, yet the incidence of the combined land-tax and water-rent in Madras is lighter than in the North-West Provinces. It is also lighter than the incidence of the land revenue proper in Oudh and Burmah, where the State has provided no irrigation whatever. If the water rent in Madras be taken at Rs. 3 per acre (somewhat less than the average charge* for canal water actually paid in the North-Western Provinces) then the land revenue of Madras would stand thus :—

	Rs.
Land revenue and water-rent - - - -	4,50,00,000
Deduct water-rent - - - - -	1,20,00,000
Balance, or land revenue proper - - -	3,30,00,000

And the incidence of the land-tax (proper) in Madras would be Rs. 1·03 per head of the population, that is to say, the land-tax would fall more lightly on the land and on the population of Madras, than it does on the land and population of the North-West Provinces, or of Oudh, or of Bombay, or of the Punjab, or of Burmah. The land-tax in Madras is heavier on the land and on the people than the land-tax of permanently settled Bengal on its land and people. But in this respect Bengal taxation must always compare unfavourably with that of the rest of India.

22. Then, as to the Madras ryot being poor and unable to pay the arrear land revenue of a bad year from the surplus profits of a good year. It certainly seems that the Madras ryot was poor, and the land-tax often pressed heavily and unequally upon him in the first half of the century. But some of the older Madras revenue officers who have been consulted say that the position of the Madras ryot has improved very greatly since those days. The revenue rates have been revised and equalised, and the crushing revenue rates of Rs. 27 and Rs. 33 an acre, which used to be demanded are now unknown. A ryot has now to pay at "dry" revenue rates for the land he irrigates from his wells. And there has during the last 20 years been an enormous rise in the prices of all agricultural produce, without any commensurate rise (indeed, without any considerable rise at all) in the land revenue rates. The total land revenue of Madras has, indeed, risen, but this is due to the spread† of cultivation and to the great extension of irrigation facilities, rather than to any enhancement of the land revenue rates.

23. The facts and arguments regarding the great improvement which has taken place in the condition of the Madras ryot are well put by Mr. Dalyell in his Famine Memoir of 1866. He shows that the money value of a ryot's crop was in 1866 nearly double what it was in 1856. And he states that, as one consequence of the great rise in agricultural profits, the area of ryotwari cultivation rose from 10 millions of acres in 1856 to 16 millions of acres in 1866. The best opinion seems to be that, compared with what he was 25 years ago, the Madras ryot is now a well-to-do, substantial, peasant proprietor.

24. Sir Richard Temple's tour in the Madras districts was short; but there were ample opportunities of inquiring from the revenue officers. The Collectors of Kurnool and Chingleput, alone of the Collectors, described their ryots as poor. It seemed to be the general opinion, that in other districts the ryots were in ordinary years well of, and enjoyed (for an Indian rural population) a high "standard of comfort." Nowhere in Madras were heard accounts of any general indebtedness and ruin of the ryots, such as are told, orally and in the reports, regarding the ryots of Sholapur, Poona, and part of Khandesh. Regarding the ordinary condition of the ryots of "dry" lands in Bellary, Kurnool, and Cuddapah, no estimate could be formed during a short tour in a time of famine. But no one who has seen the splendid cultivation of the delta country in Tinnevelly, South Arcot, Trichinopoly, and Tanjore, can regard the peasant proprietors of those tracts as heavily taxed, when they pay a combined land and water-rent of 5 to 8 rupees an acre for fields which yield two and three crops a year. Nowhere in India, save in the best parts of the delta districts of Eastern Bengal, can such rich cultivation as that which covers the irrigated lands in the delta districts of the Madras Presidency be seen.

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* *See* paragraph V. of the note appended to his memorandum.

† NOTE.—*See* the facts as to increase of cultivation quoted from Mr. Dalyell's Memoir in the next paragraph.

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25. Statistics regarding the selling price of land in Madras districts are not at present available; but it is understood that 400 rupees and 500 rupees an acre is no uncommon price for irrigated lands in the delta districts. The Madras Administration Report does not contain tables of the ordinary wages of labour. But, so far as could be ascertained, the daily wages of an adult unskilled labourer in Madras ranges from 3 annas to 4 annas; that is to say, 50 to 80 per cent. higher than in the North-West Provinces, the Punjab, or Behar. And it is reasonable to suppose that, where the wages of unskilled labour are high, the earnings of the classes above the common labourer must be fairly good.

26. There remains the argument as to the extreme smallness of so many ryotwari holdings in Madras. It may be taken that, under ordinary circumstance, a Madras ryot can maintain himself and his family on a holding of nine acres of "dry land," or on a holding of 4 acres of "wet" land. He would till his fields himself, and would spend very little on wages. His surplus profits per acre would be greater than in the case of a large holding of 25 to 30 acres, whereon hired labour was employed. And the proprietor of the small holding would be able to make good the small arrears on a bad year as easily as the proprietor of a large holding could pay the larger arrears due from him. In Madras there are a great number of petty ryots whose holdings range from 1 to 3 acres; and in ordinary cases such holdings do not suffice to support the ryot and his family, who probably work for hire during a part of the year. The liability to make good the arrears of a single bad year (3 or 4 rupees in all) would not press very hardly on such a ryot in a country where the wages of labour are high.

27. There remains the alleged risk that the ryots, if called on to pay the arrears of a former year, would throw up their holdings. In Northern India the land revenue settlement binds not only the Government but also the landholder for the term of its duration. But the Madras settlement, while it binds the Government not to demand more than the fixed revenue rate, permits the ryot to surrender his holding any year he chooses. But the land in Madras districts is, for the most part, a valuable possession; the land revenue is moderate; the soil is good; markets are near; means of communication are remarkably good. And it may very well be doubted whether any considerable number of ryots would throw up their lands because they were called upon to make good the arrears of a bad year from the surplus profits of two or three bumper crops. Wholesale surrender of lands does not occur in a Madras district when the full land revenue is collected, without any suspensions or postponements, in years of partial failure of crop.

28. The only occasion that can be recalled on which similar apprehensions were expressed was in 1866–67. In that year the Commissioner of Assam, acting under the orders of the Government of Bengal, raised the (previously very light) land revenue 70 per cent. all round. The Assam ryots held their lands direct from Government on yearly leases. It was predicted by some of the revenue officers that the sudden enhancement of the land revenue would cause the ryots to surrender their holdings. But the Commissioner of Assam knew that the lands of Assam were fertile, and could well bear an increased revenue; so he persevered. Many thousands of ryots thereupon resigned their holdings, but after they had filed their resignations in the Collectors' offices, they one and all returned home and tilled their lands just as before. So the enhanced revenue was paid, and the area of actual cultivation hardly decreased at all.

This Assam case is adduced to show that Indian ryots are not so short-sighted as to throw up good properties because the fiscal arrangements of Government impose on those holdings, temporarily or permanently, a moderate burden.

29. It is submitted that there is really nothing so special in the condition of the Madras ryot and his tenure as to make it expedient for the State to grant him remissions of land revenue under circumstances which entitle landholders in other parts of India to suspensions of land revenue instead of remissions. It was shown (para. 2 above) that the Government grants remissions of land revenue very sparingly indeed to landholders of Northern India, even in famine years. If the Madras ryot, however, gets his land revenue remitted in a famine year, and if the Imperial Government accepts the practice as correct, then it will be very difficult to refuse similar concessions to landholders and ryots of other provinces which may hereafter be afflicted by famine.

30. If all the costs of a famine, including losses of land revenue, are hereafter to be borne by the province concerned, then other provinces of the empire have less interest in the amount of land revenue remissions which may be granted in the famine-stricken districts of Madras. But if the loss caused by such remissions has to be made good from the general taxation of the empire, then the taxpayers and administrators of other

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provinces have some claim to ask, either that the practice of Madras in this respect be re-considered, or else that similar concessions be made to them when they are afflicted by famine.

31. If it be said that the practice of postponing arrears of land revenue from one year to another is new to the Madras Presidency, then it might be replied that the practice of spending millions of public money on saving famine-striken populations, though its humanity and expedience are widely admitted, is to some extent new also. This advance of policy—an advance which no English or native administrator will regret—involves a vast expenditure of public money. And, therefore, in the interests of the public treasury, the Madras Presidency may reasonably assimilate its practice, in respect of remissions of land revenue, more nearly to the practice of other parts of India, and thereby secure the State against very large, but avoidable, loss of revenue in years of famine.

No. 18.

Encl. in No. 51.

NOTE by MR. BERNARD to PARAGRAPH 20 of his MEMORANDUM regarding Land Revenue Remissions consequent on the Failure of Harvests in 1876.

It may be well to cite the authorities for the figures used in obtaining the results summarised at the end of paragraph 19 of the foregoing memorandum.

MADRAS.

2. The incidence of land revenue per acre is taken from the tables at pages 99, 101, 102 of the Administration Report for 1874–75. The total assessed area is given (pp. 101, 102) at 19,380,000 acres. The land revenue (inclusive of the water-rent) on these lands is put down at 329 lakhs. If to this be added the water-rent on ryotwari lands of the Krishna and Godavari, about 15 lakhs, we get a total land and water revenue of 344 lakhs on the ryotwari lands of the presidency. And this gives an average incidence of Rs. 1·75 per acre.

3. The total land revenue of the Madras Presidency is taken at 450 lakhs. In the Administration Report for 1874–75 the total land revenue is variably stated at 463* lakhs, 455 lakhs, and 442 lakhs. A land revenue of 450 lakhs on a total population of 32 millions gives an incidence of Rs. 1·4 per head.

4. It is not quite clear how much land is irrigated, or what is the total of the combined land and water-rent for the "wet" lands. The revenue chapter of the report (page 102) gives the "wet" lands at 3,500,000 acres, yielding a total revenue of 162 lakhs. The irrigation chapter (page 301) gives the irrigated area at 4,500,000 acres, yielding a total revenue of 192 lakhs. The irrigated zemindari lands paying 8½ lakhs (page 99) water-rent account for only a small part of the discrepancy. I have split the difference, and taken the irrigated area at 4,000,000 acres, on which the water-rent, at Rs. 3 per acre, would be 120 lakhs. The balance, 320 lakhs, being land revenue proper, falls on the total population at the rate of Rs. 1·03 per head. And the land revenue† proper, exclusive of the water-rent, falls on the ryotwari lands at the rate of Rs. 1·1 per acre.

† 167 lakhs on "dry" land, page 101.
57 lakhs, being 162 lakhs (page 102) less by Rs. 3 an acre for water-rent on 3,500,000 acres.
224 lakhs,—total land revenue proper on the area given.

NORTH-WEST PROVINCES.

5. The land revenue is taken (page 269 of the Administration Report for 1875–76) at 419 lakhs. But out of this total, 9 lakhs are (page 139) indirectly due to irrigation; so that the land revenue proper is only 410 lakhs. The water-rent, direct and indirect, is (page 139) 37½ lakhs. The area irrigated is (page 141) 1,188,000 acres; so that the water-rent falls at about Rs. 3⅛ per acre. The total cultivated revenue-paying area is (General Statement III. of the Census‡) 23,750,000 acres; and on this area the combined land and revenue rent (447½ lakhs) falls at the rate of Rs. 1·88 per acre, while the land revenue proper (410 lakhs) falls at the rate of Rs. 1·72. On a population of 31 millions the land and water-rent fall at the rate of Rs. 1·44, and the land revenue proper at the rate of Rs. 1·32 per head.

* These totals seem to include about 10 or 12 lakhs collected on behalf of village officers or others entitled to allowances. I have, however, made no deduction on this account.

‡ I have no access to more recent returns of cultivated areas.

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Oudh.

6. The table of page xxxi of the Oudh Administration Report for 1875–76 gives the total land revenue at 148 lakhs; and the rate per acre of cultivated land under assessment, Rs. 1-12-11 (or Rs. 1·8). The population of Oudh is (page xxvi) 11,180,000. And on the population the land revenue (without any water-rent) falls at the rate of Rs. 1·3 per head.

Bombay.

7. If Sindh be included, then, according to the last Census Report, the area of cultivated land assessed to land revenue is 23,900,000 acres. The total land revenue in the Administration Report of 1875–76 is stated (page 202) at 369 lakhs, and also (page 226) at 339 lakhs. In the Census Report the land revenue is taken at 260 lakhs. The explanation of this discrepancy, perhaps, is that the Census Report gives the net land revenue, after deducting from the gross assessment "the allowances and assignments" made out of the gross land reveuue. These allowances are in most other parts of India paid direct by the villagers to the recipients, and do not pass through the public treasury. The total of "assignments, &c." is (page 203) 75½ lakhs, out of which about 63 lakhs are deductions from the land revenue. For the purposes of the present calculation the Bombay land revenue has been taken at 280 lakhs. This gives an incidence of Rs. 1·17 to the acre, and of Rs. 1·72 on the population of 16¼ millions.

British Burmah.

8. The Administration Report for 1873–74 gives (paragraph 334) the total territorial revenue,—that is to say, the land tax and the capitation tax—at 72 lakhs. The cultivated area is given in the same report at 2,400,000 acres; and the population by the last census 2,818,000. These figures give an incidence of Rs. 3 per acre and Rs. 2·55 per head of population.

Punjab.

9. The last census gave a population of 17,600,000. The Administration Report of 1875–76 gives the land revenue at 202 lakhs, of which 2 lakhs were tribute; so that the land revenue proper was 200 lakhs. The area of cultivated land under assessment is put at 14,400,000 acres. These figures give an incidence of Rs. 1·38 per acre and Rs. 1·14 per head of the population.

Encl. in No. 51.

No. 19.

Memorandum by the Honourable E. W. Ravenscroft, C.S.I., Chief Secretary to Government, Bombay.

The subject of remissions of the land revenue in the Bombay Presidency was in an unsettled state until the 7th February 1877. On that day the Government of India telegraphed as follows:—

"Government of India do not desire to limit the discretion of local Government in matter of this kind, and will be satisfied if Collectors are again warned against too free remissions, and authorised to hold balances in suspense in cases in which it appears likely that the ryot will, without undue pressure, be able to pay up next season."

On the 13th February the Bombay Government, having fully considered the whole question, issued the following Resolution:—

"Copy of the Government of India telegram to be sent to the three Revenue Commissioners for information and guidance.

"2. In individual cases of remissions, Collectors will use the discretion which is entrusted to them by Government to dispose of such cases.

"3. Where general and large remissions are to be given, they will report the matter to Government through the respective Commissioners for final disposal."

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Again, on the 21st February 1877, the following letter was written to the Revenue Commissioners:—

"I am desired by his Excellency the Governor in Council to draw your particular attention to the concluding portion of the telegram from the Government of India on the subject of remissions —

"'The Government of India will be satisfied if Collectors are again warned against too free remissions, and authorised to hold balances in suspense in cases in which it appears likely that the ryot will, without undue pressure, be able to pay up next season.'"

These orders show the exact conditions on which remissions and suspensions of land revenue are granted by the Bombay Government. The method of carrying out these orders is as follows:—The Assistant Collector in charge of each taluka makes a careful investigation of the state of the crops of his taluka. The charge of each officer not being very large, he is able to do this in an efficient and thorough manner. Having satisfied himself, by personal examination, as far as is possible, and where he cannot personally examine, on the reports of the native officials, he submits his proposals, both as regards remissions, and suspensions to the Collector of his district. The Collector of the district satisfies himself as to the propriety of the proposals; and when satisfied, forwards them to the Revenue Commissioner of the division. This latter officer then submits the proposals as regards each taluka separately to Government; and final orders, after full investigation of all the papers, are passed by Government. By this means it appears that the orders of the Government of India are carried out according to their letter and spirit. Up to the present time the revenue settlements of many talukas have not been made. It is not therefore possible to say yet what proportion the remissions will bear to last year's collections, or to suspensions held over for collection till next year. To give however some idea on the subject, some of the talukas of the Collectorate of Ahmednagar may be quoted. In the taluka of Nagar the trifling sum of 3 annas has been remitted, whilst the sum of Rs. 36,102–5–2 has been held over for future collection. In the taluka of Jamkhed Rs. 28,532–8–1 have been remitted, and Rs. 7,137–2–3 held over for future collection. In Kopargaon Rs. 26,009 have been remitted, and Rs. 54,062 held over for future collection. These figures are all much lower than the original estimates; and I have no doubt that the remissions of land revenue will be considerably less than was at one time probable. I think 25 or 30 lakhs will cover all the remissions. After the fullest inquiry I feel convinced that the revenue officers, though most heavily worked with famine matters, are paying the closest attention to the very important subject of collecting the land revenue. They are loyally carrying out the wishes of Government, which, briefly, are to see that the State does not lose more than is actually necessary, but at the same time to see that the ryot is not unduly pressed. I believe also that the ryot fully recognises the liberality and equity of Government. He knows perfectly well that Government must collect that portion of its land revenue which the ryots *can* pay; and he knows also now by experience that Government are willing to draw distinctions between different grades of want, and that in some cases it would be foolish to forego altogether what may be collected with care at a future time. If a hard and fast line had been drawn that *no* revenue was to be remitted, but that every farthing was to be collected in some future year, the ryot in many cases would have become utterly despondent or reckless. He now feels that his case is judged on its merits. If his misfortune has been so great, and his condition is so critical, that to compel him to pay this year's rent either now, or in the future, would ruin him, he knows he will be let off altogether. If without undue pressure, he can pay at some future time, he feels that he is not being called on to do anything that is unfair, and he willingly accepts the alternative.

The subject of collecting in future years the outstandings of this year will require much consideration; but this can be settled when all the Jamabundies are completed, and the full amount of remissions and suspensions is known. Statements are being daily corrected in the Secretariat, showing the exact amount of remissions and suspensions up to date; and these will enable Government, as soon as the famine is over, to learn exactly, without loss of time and in detail, how the very important subject of remitting or suspending the land revenue has been treated in the different collectorates of this presidency affected by famine.

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Encl. in No. 37.

No. 20.

No. 1669B., dated Fort St. George, 8th May 1877.

From the Additional Secretary to the Government of Madras to Mr. C. E. Buckland, Private Secretary to his Excellency Sir Richard Temple.

I am directed to acknowledge receipt of Mr. Bernard's letters, Nos. 197, 199, 202, 204, 206, and the Minutes by Sir Richard Temple to which they gave cover, and to state, with reference to Sir Richard Temple's suggestions regarding South Arcot, that while the Government are prepared to meet the question of the concentration of all able-bodied labour in the district on public works under the Public Works Department and of the relaxation of certain departmental orders, it is not possible to lay down any rule until the probable area over which distress is likely to extend is more accurately indicated, which cannot be the case until it is known whether rain has fallen in any of the taluks of the district.

2. With regard to Sir Richard Temple's suggestions relative to the conduct of public works in the North Arcot district, I am to state that his Grace in Council does not consider it is expedient to issue a general order that all able-bodied persons in need of relief should be drafted to the irrigation works, as much will depend on the locality or nature of the works in question and on the seat of distress from time to time.

3. In reply to the suggestions relative to the removal of paupers from relief camps, I am to state that the removal of small parties has already been carried out in various cases, but has not been very successful, the paupers having in some cases returned on foot long distances in order to gather round the visionary plenty of the presidency town, a proceeding which there was no legal means of preventing.

4. The suggestion contained in Mr. Bernard's letter, No. 204, must of necessity be adopted as the consequence of giving effect to the order of this Government quoted.

5. Sir Richard Temple's other suggestions will receive careful consideration.

Encl. in No. 79.

No. 21.

No. 431, dated 8th May 1877.

From Surgeon-Major W. R. Cornish, F.R.C.S., Sanitary Commissioner for Madras, to the Additional Secretary to the Government of Madras, Revenue Department.

I have the honour to acknowledge receipt of G.O. No. 1,630, of 3rd instant, and, with reference to the question therein raised, to submit the following remarks.

2. In my report dated 29th April, I mentioned that the Honourable Sir Richard Temple had, at Goondacul, on the 24th of April, picked out 41 men from a gang of 180, who from weakness and emaciation were obviously unfit for work, and whom he considered should be fed at a relief-house without work. Of these persons, so far as could be ascertained, only 12 had recently come on the works, the remainder having been present for two or more months. In addition to these 41, I noted 18 others who, in my opinion, were in very feeble condition. As, at a previous inspection on 23rd February 1877, Dr. Harvey, Sir Richard Temple's medical attendant, specially comments on the fine physique of the Goondacul gangs, the only inference I can draw from the fact is that, to quote Sir Richard Temple's own words, the men had been getting "thinner and thinner" and "weaker and weaker, till at last they have had to be drafted off to "gratuitous relief-camps as unfit to work."

3. I have, in former reports, commented on the great fluctuations which occur in the units of gangs on relief works. From a variety of causes the people met with at one inspection are not to be found at a subsequent inspection. For instance, Dr. van Someren, about two months ago, weighed 25 men, 25 women, 25 boys, and 25 girls (total 100) of the relief labourers at Palaveram, and at an inspection made conjointly with myself on Thursday, the 3rd instant, there were present of the 100 persons—

Men	12
Women	3
Boys	5
Girls	4
Total	24

that is, more than three-fourths of the individuals whose heights, ages, and weights were specially registered were not at the works two months subsequently.

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4. Now the experience of the Palaveram works is the experience more or less of every relief work in the country. Of the people who come to work, some few remain permanently, but the great majority are constantly shifting from week to week and month to month. The weakly ones I imagine, from Mr. Howe's experience in the Bellary district, are turned out of the gangs by the maistries, or else give up in despair and wait quietly at home to die.

5. I am quite aware of the fact that in the several labour gangs are to be met many persons who have not been perceptibly reduced in flesh or strength, and their presence amongst the labourers, no doubt, tends to the support of the view that relief wage is, in itself, sufficient to keep a man in health and strength. According to my experience, these well-to-do looking people are mainly composed of two classes :—

(1.) Of small landholders and servants of ryots who have obviously other means of livelihood besides what they get from the Government relief.

(2.) Of the flesh-eating castes to whom the famine has brought an enormous supply of cheap and nourishing food, and who have been exceptionally well off during the period when cattle were dying, or being sold for a mere trifle to the lower castes who used animal food.

6. A very close and minute inspection of relief labourers in various parts of the country has satisfied me that it is chiefly the above classes who are in good physical condition; and I think it has been the presence of so many of the flesh-eating classes amongst the gangs that has tended to give wrong impressions regarding the actual condition of the people as a whole.

7. From the constant changes going on in the individuals of the several gangs on relief labour, it is clear that there is the greatest difficulty in tracing out the effects of wages on their health and strength; but the impressions of famine officers like Messrs. Price, Gribble, Oldham, Murray, Ferricks, and others, who have had daily opportunities of observations, cannot be lightly set aside, and I think there can be no reasonable doubt that of the vast number who go for a short time on relief works and then leave them, many do so from a conviction that the wage is insufficient for the maintenance of their health and strength, and that many of these gradually drift into a low condition and die in their homes, or ultimately come in great numbers on our gratuitous feeding camps.

In my report on Bellary I alluded to the case of a man who had been on relief works, but whose wife died of starvation, and afterwards two children died in the same way, the third child being in an hopeless state when I saw it, and the father himself so stricken that I doubt if he can survive.

8. Government are well aware of the rapid and enormous increase of gratuitous relief,—not for young children or old people only, but to those in the prime of life,—in all the distressed districts. This is a sure indication of increasing weakness and diminishing vitality amongst the labouring classes.

9. The death registration in the famine districts, as compared with that in districts which have not hitherto required special means of relief, tells the same tale. In the returns before me for the month of February 1877, the registered deaths in the eight famine districts as per margin were in the annual ratio of 81·3 per thousand of the population, while in the remaining districts of the presidency (with the exception of Tinnevelly and South Canara, the figures of which have not come to hand), the registered mortality was only 23·2 per thousand. The people, in fact, of the famine districts in the month of February were dying nearly four times as fast as in other parts of the presidency. Cholera and small-pox have been general throughout the presidency, but it is only in the famine tracts that this excessive mortality has been going on (the figures for the months of December and January are given in my letter and memorandum, No. 243, of the 6th April).

Madras.	Cuddapah.
Chingleput.	Bellary.
Nellore.	Kurnool.
North Arcot.	Salem.

10. It would seem, therefore, to be idle to dispute or question the fact of the connexion between the famine and mortality of the population. The connexion between the experimental famine wage and the mortality of the labourers is not so easy to trace, for the reason that the labour gangs fluctuate so violently as regards their *personnel* that we cannot trace out the history of the individual workers with the precision that is so desirable in an experiment like that of Sir Richard Temple's; and secondly, the destruction of life by chronic insufficiency of food is a very slow, though very certain process. It is easy enough to make assertions on either view of the case when proof is impracticable. The difficulty lies in following out the history of a sufficient number of

Note.—Bullocks, carrying from 70 to 100 lbs. of flesh, have been sold for 8 annas each during the famine

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individuals. As regards those weakened by insufficient food, it seems quite obvious that the tendency would be to their elimination from the working gangs and to their joining the ranks of the sick and the diseased, which swells so largely the mortality bills of the famine districts.

11. But however this may be, I must again take my stand on the insufficiency of the famine wage to supply the food necessary for the physiological requirements of the body. The practical results show that the wages have been inadequate to keep the people steadily at work, and the increasing numbers of persons unfitted for work show that the famine relief has not met fully the necessities of the people in the way of keeping up their health and strength. That there are many able-bodied persons still remaining on relief works I very gladly admit; but I do not think that they have had to thank the famine wage for their present condition, while I am quite certain that in the case of those who have had no other means of support, or in those unable or unwilling to use the abnormal supply of cheap animal food, the effects have been and will be disastrous.

12. I infer from the present Minute by Sir Richard Temple, as well as from some of his earlier reports, that he supposes the rescue of persons who have fallen into a weak and emaciated state from prolonged ill-feeding to be a very simple matter, necessitating only care and the judicious use of nourishing food. But my own warnings to the Government have all along been distinct on this point, that chronic starvation is a disease practically beyond remedy, and that more good will result from keeping the population from falling into a low state than from any subsequent efforts to save life in the case of those whose vitality has been imperilled by insufficient food for a long period of time. If the famine has taught us anything at all, it has certainly shown us what a very dangerous condition chronic ill-feeding will bring the people to, and the extreme difficulty of remedying this condition by the most careful and humane system of treatment.

13. The great facts to be borne in mind in connexion with the system of relief works is the constant shifting of the units of the gangs, the general preponderance of women in the gangs, thereby showing that some of the able-bodied male population have other sources of employment and most probably of income also. The next two months will prove a very critical time for those who have still strength to work, and it seems to me that on grounds of public policy, it is highly important that work should be everywhere found for those who really need it for their maintenance, and that it would be safer to err on the side of liberality in this respect up to the time when the normal agricultural employments of the people are resumed.

14. I suppose no one has yet been able to frame anything like an estimate of the effects of the famine on the population, but, making due allowances for defective registration of mortality and for the inevitable mortality that must outlast the dearth of food, I have grounds for supposing that the population of the affected districts will be reduced in eighteen months' time by one-fifth or one-sixth of the number living before the scarcity commenced. This of course is an estimate only based on the current birth and death-rates, and the present generally enfeebled condition of the working classes in the affected districts.

Encl. in No. 51.

No. 22.

No. CXVI.—Minute by Sir Richard Temple, dated Bombay, May 9th, 1877.

In the remarks made towards the end of Part III. of my general report on the famine in the Madras Presidency, regarding the collection of the land revenue, it was stated that I might have to offer some further remarks on that subject, which is very important, involving, as it does, a proposed remission of land revenue to an amount of nearly one and a half million sterling (143 lakhs of rupees). Any such remission, if it is really conceded, must necessarily be a circumstance of much gravity. I accordingly submit a momorandum drawn up, at my request, by my Secretary, Mr. Bernard, of the principal arguments which, to my mind, affect this important question; also a memorandum by Mr. Ravenscroft, Chief Secretary to the Government of Bombay, of the orders given in the Bombay Presidency on the subject. If a reference be made to the Minute by Sir W. Robinson and the letter by Mr. Carmichael and the Board's circular of the 1st March, it will be seen that there is a considerable difference between the practice which is being pursued in Madras and in Bombay, and that the practice in Bombay will probably lead to a greater proportion of the land revenue being collected in that presidency than in Madras. There is in the Bombay Presidency, as I am informed, a much closer scrutiny than in the Madras Presidency into the circumstances of every ryot or payer of land-tax, on whose behalf remission of land revenue is claimed: the question

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being in Bombay, not whether a man has lost so much of his crop or whether he would be entitled to remission according to an assumed rule of per-centage; but whether his circumstances admit of his paying the revenue which he had by settlement engaged to pay. My impression is, that in Madras many ryots are likely to obtain remissions, because a part of their crops failed, notwithstanding that the other part, which was saved, yielded them a good money return quite enabling them to pay their revenue. If this be so, it ought not, I submit, to happen. It certainly would not happen in the Bombay Presidency. The main point, however, is this, that in Bombay no land revenue is now remitted so long as there is any chance of its being collected. It is, indeed, suspended for the moment, if its immediate collection seems calculated to bear hard upon the ryot. Time is readily allowed to the man within which to pay. If the seasons become propitious, he will have the means of paying; if they continue unpropitious, the amount at first suspended may have in the end to be remitted. In Madras, on the other hand, there seemed to be at the outset a disposition to remit much of the land revenue as soon as the failure of crop had declared itself.

The orders by the Madras Revenue Board will lead to more, or to less, of remission, according as they are carried out with a disposition to make concessions or with strictness. If they be carried out with strictness,—that is, if the revenue officers be instructed to collect all that they fairly can within the lines laid down by the Board,—if, too, they be duly impressed with the serious consequences of an extensive remission of land revenue,—then I should hope that, if the coming season shall prove propitious, much revenue may yet be collected, and the amount actually remitted may ultimately prove much less than the first anticipation. There is time within which much may yet be done, as the remission inquiries are still going on, and as the matter will not be finally settled till July, or perhaps till August. If instructions in this sense were now to issue, much of the threatened loss of land revenue might yet be retrieved.

Orders in this sense have been previously given in the Bombay Presidency, and will be reiterated. The amount first estimated to be remitted was 78½ lakhs of rupees. The second estimate was 56 lakhs, but the best authorities now hope that the amount actually remitted will prove much less. The Government itself exercises supervision over this subject. The amount proposed to be remitted in every single village has to be reported to Government, and is not finally remitted till the orders of Government have been received. This practice does, doubtless, act as a check upon remission.

Whether the same practice prevails in Madras, I am not sure.

It must always be borne in mind that if the drought continues (and the latest accounts of the weather in Southern India are perhaps less favourable than the anticipation), then the remission in the Madras Presidency, as elsewhere, will become greater as the difficulty of collecting the land revenue increases.

Also, it is, perhaps, superfluous to repeat (what, indeed, has been stated in previous papers) that this question in the Madras Presidency refers only to the "dry" or unirrigated lands (including, however, lands irrigated from wells) and not to the "wet" lands irrigated from tanks or canals.

But my sojourn in the Madras Presidency impressed me with the view that greater pressure ought to be put upon the cultivators of the wet lands to cultivate these lands as "dry," or unirrigated lands, whenever the tank water or the canal water fails. It often happens in these lands that, although the water supply from the tank or the canal is withheld, and, consequently, the superior crops cannot be raised; still some crops, perhaps of an inferior sort, can be afterwards raised by digging temporary wells and other expedients. The existing revenue system seems to me to fail to apply an adequate stimulus to the cultivator in this respect.

If the tank water is withheld, full remission of land revenue follows as a matter of course; although for many years past, the cultivator has drawn a good profit from these fields. If, afterwards, a man chooses to grow "dry" or inferior crops on these lands, he will, indeed, be charged with land revenue. But if he neglects to do so, and lets his land be uncultivated, he is not charged at all; and thus he has not the stimulus which cultivators in other parts of India have, who know their liability to pay land-tax even if they neglect to cultivate. It might not be difficult to arrange the settlements so that the cultivators of wet lands should feel themselves obliged to do their utmost to raise "dry" crops on their lands in years when the tank water fails.

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Encl. in No. 51.

No. 23.

No. CXVIII.—Memorandum by Mr. C. Bernard, late Secretary to Sir Richard Temple.

Proceedings of the Madras and Bombay Revenue Authorities in regard to Remission of Land Revenue in 1876–77 up to the end of March 1877.

Nágpur, May 10, 1877.

In a memorandum dated the 28th April was offered some account of the general considerations affecting the question of remitting land revenue due from famine-stricken tracts. Copies of correspondence regarding revenue remissions in most of the affected districts of Madras have now been received.* The proceedings of the Bombay Government and its officers in respect of revenue remissions are also available, and Sir Richard Temple desires to submit this brief review of these papers, with his remarks, to the Government of India. This memorandum could not be prepared until after the close of Sir Richard Temple's mission to Madras, because the necessary papers were not received until the beginning of the month of May.

* Chief Secretary's letter dated 26th April 1877.

2. In case this review should be read without the previous memorandnm of the 28th April, it may be well to state very briefly some of the distinctive features of the Madras revenue system.

About one-fifth of the cultivated land of Madras is held by large proprietors (zemindars) on quit-rents, settled in perpetuity many years ago. The remaining four-fifths are held by petty proprietors (ryots), at land revenue rates liable to periodical revision. The land revenue of Madras is derived from three distinct sources, namely:—

		Rs.
Permanently settled, quit-rent, and zemindari estates paying about		69,00,000
Irrigated ryotwari lands, paying land revenue at "wet" rates, about		1,70,00,000
Ryotwari lands which are unirrigated, or are irrigated only from wells, paying at "dry" rates, about		1,69,00,000
Add—for the two West Coast districts	Rs. 30,70,000	
for miscellaneous land revenue	„ 26,50,000	
		57,20,000
Total		4,65,20,000

Over a part of the Madras Presidency (about nine districts out of 21) the land revenue has been settled for 30 years. At the settlement a deduction is made to meet losses from vicissitudes of season before the Government revenue is assessed on the land. In the settled districts, and also in the districts not yet settled, the land revenue is separated into—

(*a.*) The demand from "dry" lands;

(*b.*) The demand from "wet" land to which the State supplies water for irrigation; this demand includes both the revenue from the land and the rent of the water.

3. Every season the revenue authorities verify the land actually held by each individual ryot, surcharge any ryots who have cultivated extra lands, and grant remission of land revenue to certain of the ryots whose crops may have failed. This annual operation, which extends over some months, is called the "jamabandi." The rules under which remission of land revenue is permissible are, briefly, as follows:—

(1.) The land revenue is remitted in full on all "wet" lands, whereon the crop may have totally failed by reason of lack or excess of water.

(2.) In districts not yet settled, partial remission of land revenue is granted for lands whereon the crop may have partially failed from like causes.

(3.) No remission of land revenue is permissible in respect of "dry" lands, save in "very exceptional" years and very exceptional "seasons."

When "dry" remissions are necessary, the Collector reports to the Board what percentage of the land revenue ought in his judgment to be remitted on the "dry" lands in any specified tract or tracts of his districts. The Board passes orders on such report. Remissions are granted at "jamabandi" according to the rate sanctioned by the Board on all the "dry" lands of the specified tract, irrespective of the means of individual ryots, and irrespective of any good crops which such ryots have had on their "wet" lands, or which they may have secured by special effort, or by some chance on their "dry" lands.

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Until the "jamabandi" of a tract or district is done, the financial results of the remissions sanctioned thereon cannot be known. Collectors and Sub-Collectors have full discretions to award more or less remission to any tract, and to treat any village or tract specially, so long as the limit of remission sanctioned by the Board is in no case exceeded. Thus very much latitude is, in this matter, left to district officers who are the constituted guardians both of the people and of the public revenue.

4. The ordinary rules were held to suffice for the requirements of the present season. No special orders were issued regarding remissions when the famine declared itself in December last, or when Sir Richard Temple, during January 1877, recommended caution in remitting land revenue. But on the 1st March the Board issued a circular, which will have an effect in restricting remissions at the "jamabandi" now being effected all over the Madras Presidency. A copy of that circular is appended;* its results should be advantageous to the public treasury. Its purport was that the disposition of Tahsildars† and subordinate Revenue officers to recommend wholesale remissions, should be checked; that remissions should not be given for "dry" lands whereon one moderate crop had been secured, even though that crop were not the principal crop of the year; that the per-centage of remissions sanctioned by the Board was in each case a maximum, and remissions should be kept below the maximum wherever possible; that no remission should be allowed for partial failure on lands which had yielded half an ordinary crop, for the money value of such a yield was large owing to the high prices prevailing.

* NOTE.—*See* Appendix A. The meaning of parts of that circular will perhaps be veiled by the use of vernacular terms peculiar to Madras. It may be well, therefore, to explain that—
Punjah lands are those assessed to land revenue at "dry" rates;
Nunjah lands are those assessed at "wet" rates;
Shavi lands are those on which the crop may have withered, by reason of drought, before harvest.

† NOTE.—The correspondence summarised in the following paragraph shows that revenue officers above the grades here described occasionally recommened "wholesale remissions."

5. The correspondence now forwarded regarding remissions may be summarised for each district, as follows:—

BELLARY.

The Collector reported that "wet" remissions would be granted under the rules; he asked general sanction to the grant of requisite "dry" remissions by officers making the "jamabandi." The Board granted (31st October) the general sanction asked. Nothing further passed on the question. No subsequent report seems to have been received from the Collector. The latitude of discretion given him by the Board will have been limited somewhat by their circular of 1st March.

KURNOOL.

The Collector proposed "full remissions of 'dry' assessment, as there was no doubt "that such crops had utterly failed throughout the district" * * * * Remission to be granted in cases of proved failure. The Board sanctioned (3rd January) the Collector's proposals for "cases of proved failure." They observed that on much "dry" land a crop must have been secured by means of irrigation from the canal and from wells. The Board's orders appear to Sir Richard Temple to be correct so far as they went. But the terms of the late Collector's proposal seem to be quite unguarded, and might, if acted upon, lead to an almost total relinquishment of the land revenue of the district, excepting the canal tracts. Such proposals, doubtless made at a time of alarm, indicate the need of supervision. It would have been more satisfactory if a subsequent report had been called for from the present Collector.

CUDDAPAH.

The Collector proposed full remission on all * "dry" lands not cultivated, and a per-centage remission of from two-thirds to three-fourths of the whole assessment for "dry" lands in villages whereon there had been partial failure of crop. The Board sanctioned (10th February) the Collector's proposals, but pointed out that a very moderate crop would give the ryot a good money yield at present prices. Here, again, the proposals made by the late Collector seem to Sir Richard Temple to be excessive and to amount to this—that under a settlement the ryot is to have all the profit of the good years and the Government all the loss of the bad years. Here, also, it would be well to look for the report, which will doubtless be prepared by the present Collector.

* NOTE.—It is not clear if this includes assessed pasture lands; *see* reference to these lands by the Kistna District Collector below.

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Bellary, Kurnool, Cuddapah.

For each of these districts the Board sanctioned the remission of all demands on petty quit-rent (inam) holdings whereon no crop had been produced; and also suspension (*i.e.*, postponement till a better season) of the Government revenue on larger holdings of this class. The Madras Government disallowed (13th February) remission on any quit-rent (inam) holdings, but approved suspensions of the Government demand thereon in cases of extreme failure of crop. The orders of the Government of Madras seem to Sir Richard Temple to have been very necessary in this case. These holdings have been enjoyed for many good years on nominal assessments, and in a bad year the holders object to pay even this much, little as it is.

North Arcot.

The Collector asked sanction to the grant of liberal remission at "jamabandi" in certain tracts where drought had been worst. The Board agreed (13th January) to "dry" remissions being made in the specified taluks "to such extent as might seem urgently needed." The Collector subsequently (15th February) reported that he had instructed his officers to be sparing with remissions. Sir Richard Temple believes that the Collector did try to prevent excessive remissions being allowed.

South Arcot.

The Collector proposed a remission of one-third the assessment on "dry" lands (exclusive of pasture land) not brought under cultivation; and a remission of from half to three quarters the assessment on certain food crops that had failed. The Board sanctioned (13th February) remissions of one-third the assessment on "dry" waste,—nothing else,—as even a very moderate crop at the present time gives a considerable money yield. Sir Richard Temple sees great force in this remark. It would be well if this view were borne in mind oftener than it apparently is. The Collector again wrote asking for remission in cases of partial failure. But the Board adhered (10th March) to their previous order. Sir Richard Temple believes that these orders of the Board were right so far as they went.

Salem.

The Collector proposed 60 per cent. remission on the "dry" lands of three-quarters, and 40 per cent. remission on the "dry" lands of one quarter of his district. The Board were disposed (20th December) to grant "entire" remission in "villages where "the crop had entirely failed, and per-centage remissions according to circumstances "elsewhere."

The Collector wrote again, proposing 75 per cent. remission, where one-quarter of an ordinary crop had been secured; and 30 per cent. remission where two-thirds had been saved. The Board declined (3rd February) to accept the principle that remission of land revenue should be granted in the full ratio that the crop had failed; and pointed out that in other respects also the Collector's proposals went beyond the requirements of the case. The Collector sent further details, and recommended the remission of from 15 to 60 per cent. on the land revenue of tracts where there had been partial failure of the crop. The Board sanctioned (12th March) these proposals, subject to compliance with orders contained in the circular of the 1st March. These proposals of the Collector seem to Sir Richard Temple to have been extreme and calculated to involve undue sacrifice of revenue. They were very rightly checked by the Board.

Godavery.

The Collector proposed 50 per cent. remission on "dry" lands in certain villages where there had been entire failure of crop. The Board asked (2nd January) for further information. The Collector subsequently furnished information, and recommended remission at from 10 to 20 per cent. on the assessment in certain villages. The Board sanctioned (17th and 20th February) the proposals, but observed that inquiry into individual cases of failure was wrong.

Kistna.

The Collector reported that the yield on "dry" lands in his district had been, on the average, half an ordinary crop. He recommended remission of one-half the assessment on lands which had yielded less than one-fourth an ordinary crop, and a remission of one-quarter the assessment on land which had yielded less than one-half an ordinary

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crop. He also recommended remission of the assessment on pasture lands. The Board sanctioned (3rd March) the Collector's proposals, but the Madras Government called for further report on the reasons for granting remission in respect of pasture lands.

Chingleput.

The Collector proposed full remission on "dry" lands yielding no crop; and percentage remissions for short crop on "dry" lands. The Board sanctioned (19th February) these proposals. This sanction will have been much qualified by the Board's subsequent orders of 1st March. Here again, however, it seems to Sir Richard Temple that the Collector's proposals are extreme, and amounted to an almost total sacrifice of land revenue. It is to be remembered that, on the one hand, this district has great advantages from its proximity to the capital, and on the other hand, that it was then suffering from a long-continued drought extending over more than one year.

Coimbatore.

The Collector proposed three-fourths remission on all "dry" lands left uncultivated on account of drought, and partial remission up to a maximum of one-half the assessment for partial failure. Such partial remission was, the Collector said, to be granted to whole tracts, and not to individual villages or holdings. The Board approved (16th January) the Collector's proposals. These proposals of the Collector seem to Sir Richard Temple to have gone considerably beyond the necessity of the case. They will have doubtless been subsequently modified under the Board's subsequent orders of the 1st March.

Trichinopoly.

The Collector asked leave to remit up to 50 per cent. of the "dry" assessment on specially bad tracts; he said that the rates of assessment in his district are low. The Board agreed (13th February) to the Collector's proposals, but observed that no remission should be given for lands whereon one crop had been raised. They further directed (12th March) that not more than half remission should be given in any case, and not more than 25 per cent. where one quarter of an ordinary crop had been secured. Looking to the condition of this district when he last visited it (April), and to its past history, Sir Richard Temple thinks that the Collector's proposals would have involved undue fiscal sacrifice. They were very properly checked by the Board. But the fact of their having been made shows the need of strict supervision by superior authority.

Tanjore.

The Collector proposed remissions up to 25 per cent. of the assessment on certain rain-watered lands. The Board agreed (22nd March), noting that the total remission would be only Rs. 12,350.

Madura.

The report on proposed remissions for Madura is in greater detail than for any other district, and it shows cause for the recommendations respecting each tract. The Board sanctioned (9th March) remissions on "dry" lands at from 25 per cent. to 100 per cent. on the assessment in different tracts, but directed attention to the requirements of their circular of 1st March. Full remission was proposed for only 26 villages.

Tinnevelly.

The Collector proposed "either to remit or to postpone" land revenue on "dry" lands, estimated at 4½ lakhs; he estimated the "wet" remissions at 5½ lakhs, and he recommended the suspension of 1½ lakhs out of the revenue due from the zemindaris. The Board sanctioned "dry" remissions up to 40 per cent. in the settled taluks, and up to 70 per cent. in the taluks not yet settled. They directed that no remission should be given for "wet" lands in settled tracts, whereon even a partial crop had been secured. In regard to the suggestion for postponing part of the demand from ryots, and the proposal to postpone part of the zemindari revenue, it was said that the Board did "not "approve of the principle of postponement and of keeping demands hanging over the "heads of the ryots, and they did not think that sufficient reason had been shown for "extending grace to holders of permanently settled estates." Considering that Tinnevelly is a rich district and ordinarily enjoys good seasons, Sir Richard Temple thinks that it might have been expected to pay most of its land revenue, despite one drought, accord-

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ing to the practice in other parts of India; and that the Collector's proposals were over-liberal. They were properly checked by the Board. But Sir Richard Temple would not admit the Board's objection to suspending the instalments due.

No papers have been forwarded regarding remissions in Nellore, Malabar, Ganjam, or Vizagapatam. Remissions are probably being granted in the Nellore district.

6. The correspondence, of which the above is an abstract, gives no materials for framing an estimate of the probable total of the remissions. But it is clear that the more recent orders issued by the Board of Revenue tend to restrict the land revenue remissions within narrower limits than the local revenue officers had proposed. But Sir Richard Temple remarks that in some districts, however, such as Bellary, Chingleput, and Kurnool, the discretion left with the local officers in regard to granting remissions at "jamábandi" is practically unlimited. If Collector, Sub-Collectors, or Head Assistant Collectors could scrutinise the remissions, holding by holding, or even village by village, then the interests of the public treasury would in most cases be safe. But such scrutiny is forbidden by the Board's rules; remissions are granted according to the average circumstances of tracts or groups of villages; the subordinate revenue officers supply the data, and initiate proposals for per-centage remissions on tracts; and when once the per-centage remissions for a tract is decided, the rest follows by an almost purely arithmetical rule of thumb.

7. The "jamábandi" is going on everywhere, and it must have been finished by this time in many taluks. If it be not too late, Sir Richard Temple would represent that it might be well that a member of the Board should consider in personal conference with each Collector the division of the district into tracts for remission purposes, and the per-centage to be granted to each tract. In other parts of India, the Revenue Commissioner would in this way scrutinise the Collector's operations. A perusal of the correspondence leaves an impression that the attention given to this important matter has varied in the different districts. A full report like that for Madura shows that detailed information has been sifted, that the subject has been thought out, and that general proposals for per-centage remissions (whether their principle be right or wrong) have been framed after consideration of particulars. But it seems to Sir Richard Temple that general proposals for remission in full, such as were made and sanctioned for Bellary and Chingleput, leave a very wide scope for needless sacrifice of public revenue if further supervision be not exercised.

8. The papers regarding land revenue remissions in the Bombay Presidency may be summarised thus:—

"The Bombay Government decided (9th November) to deal separately with land revenue remissions proposed for each district. The Revenue Commissioner, Northern Division, proposed that the Collector and his revenue subordinates should at once settle for each drought-stricken village or group of villages the amount of remission to be given, and with the help of the village headmen should settle how much of each ryot's revenue should be collected, how much remitted, and how much postponed for collection during the next two years. The Government decided (15th and 29th November) that no remission whatever should be given in villages where half of an average crop had been secured. They reminded Collectors that assessments were fixed on an average of seasons; they said that remission should be given only to ryots of small means who could not pay without being ruined; and they directed that ryots, who might be able to realise good prices for their old stocks of grain and fodder, should get no remission, even though their crops had entirely failed."

The Government of India, in January, on Sir Richard Temple's recommendation, put the question which had been raised by the Revenue Commissioner, Northern Division, whether some part of the revenue which could not be collected this year without undue pressure on the ryots, might not be postponed for collection in future years. The Bombay Government considered that such postponements of the Government demand were contrary to the Bombay revenue system, and expressed a fear that many of the ryots were too poor to be able to pay arrears of land revenue out of the surplus of future years. On the 27th February, Bombay Collectors were "authorised to hold balances in suspense in "cases in which it appears likely that the ryot will, without undue pressure, be able to pay "up next season."

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* NOTE.—The Board wrote (2nd April) that there was nothing to prevent Collectors adjusting the proportion of remission to a single village. But such detailed adjustment is contrary to the practice of Madras, and in the foregoing abstract it will be seen that the Godavery Collector was corrected by the Board for inquiring into individual cases (apparently individual villages); and the Coimbatore Collector's determination not to inquire into cases of individual villages was approved by the Board.

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The settlement of the suspensions and remissions were not, when these papers were compiled, complete for any district. But the Commissioner of the Canarese districts reported (3rd February) that the land revenue was coming in; that even small ryots were paying out of the profits on the sale of their fodder or grain stocks; and he deprecated any stoppage of collections from those who were able to pay. Reports were received from the Násik and Ahmednagar districts, showing that in the—

Jamkhed taluka of Ahmednagar ... { Rs. 18,000 were remitted, Rs. 7,000 suspended, and Rs. 53,000 being collected.

Koparyaon taluk of Ahmednagar ... { Rs. 26,000 were remitted, Rs. 54,000 were suspended, and Rs. 1,06,000 being collected.

Karjat, "one of the most, if not the most, severely affected taluk in Ahmednagar." } Rs. 28,000 were remitted, Rs. 1,500 suspended, and Rs. 68,000 being collected.

In two different letters, forwarding statement of remissions for the Násik district, the Revenue Commissioner, Northern Division, wrote that "he would have preferred a much larger sum postponed and less remitted." Mr. L. Ashburner, for many years Collector of a part of the district, regarding which he thus writes, is one of the most experienced revenue officers in the Bombay Presidency; and it will be seen that he expresses a decided opinion that it is fitter, both for the people and the treasury, to postpone more of the revenue and to remit less, in a season like the present. Mr. E. P. Robertson, the Revenue Commissioner, Southern Division, an able and experienced officer, is also of the same opinion.

9. The present papers do not furnish any data for estimating what the total amount of the Bombay land revenue remissions will probably be. From the data given by the local officers in January last, Sir Richard Temple estimated the total remissions at 50 lakhs. A subsequent return received from the Bombay Revenue Secretariat put the estimated total remissions at 54 lakhs. But the revenue officers seem to think that the land revenue is coming in more easily than had been anticipated. And if the coming season be good, the total land revenue remission for the Bombay Presidency will perhaps not exceed 20 lakhs.

10. The difference between the systems pursued in the Bombay and Madras Presidency seems to be—

(*a.*) In Bombay, remission is granted to each ryot according to his circumstances; if he has savings from past years, he has to pay what is due on his fields, even though he may have no crop this year. In Madras remission is granted according to the average circumstances of each kind of crop over large tracts, without reference to the circumstances of each village or each ryot. The Madras system used formerly in this respect to be the same as the Bombay system. It was altered some 18 or 20 years back, for reasons which were, in the then condition of the country and of the subordinate revenue officials, considered sufficient. The Bombay plan is in accordance with the practice of landlords or revenue receivers elsewhere; it is more elastic for the people, and it is more advantageous for the public treasury. But it involves more labour and requires more honesty, on the part of village officers and revenue subordinates, than the Madras system.

(*b.*) The Bombay Government, acting on the advice of Sir Richard Temple, and in accordance with the opinion of some of its most experienced revenue officers, authorised Collectors "to hold balances of land revenue in suspense in cases in which it appears "likely that the ryot will, without undue pressure, be able to pay up next season." The Madras Government declined to postpone any of its land revenue demand, save in the case of certain permanently settled zemindaris. The decision was based on grounds which need not be discussed here.

11. The tenure on which a Bombay ryot holds his land is the same as a Madras ryot's tenure. A ryot of the Bombay Deccan (*i.e.*, Poona, Sholápur, and part of Admednagar) is reputed to be much poorer than his confrére in the Kanarese districts of the Southern Mahratta country; and my impression is that the ryots of Bellary, Cuddapah, and Kurnool are about as well off as the ryots of Dharwar and Kaládgi. In ordinary years there is much more irrigated land in the ceded districts than in any part of the Bombay Deccan. The Madras ryots of the delta and littoral districts are certainly better off than any Bombay ryots outside Gujarat.

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Encl. in No. 51.

No. 24.

No. 3,065, dated Bombay Castle, 12th May 1877.

From the Chief Secretary to the Government of Bombay to the Additional Secretary to the Government of India.

I am desired by the Honourable Sir R. Temple to forward, for the information of his Excellency the Viceroy in Council, the accompanying Minute recorded by him and other papers connected with remissions of revenue in the distressed districts.

2. Two spare copies are also forwarded.

Encl. in No. 37.

No. 25.

Dated Calcutta, the 16th May 1877.

From Dr. T. R. Lewis, Special Assistant to the Sanitary Commissioner with the Government of India, to the Officiating Sanitary Commissioner with the Government of India.

I have the honour to report, for the information of the Government, that in accordance with instructions received, I visited Bombay and made careful inquiries regarding the nature of the fever which has for some time been prevalent in that city. In carrying out these inquiries I received every possible assistance from Dr. W. G. Hunter, Acting Surgeon-General, from Dr. Vandyke Carter, Acting Principal of the Grant Medical College, and First Physician to the Jamsetjee Jejeebboy Hospital, and from Dr. Joint, the physician in charge of the Goculdass Hospital.

2. Opinions have been expressed that the fever is of an infectious nature; that it was originally produced by want; and that the disease presents the characters ascribed to the relapsing or famine fever of systematic writers.

3. In arriving at these conclusions it is probable that the very interesting fact of the detection by Dr. Vandyke Carter of peculiar organisms in the blood of several fever patients exercised considerable influence. These organisms, described as *spirilla*, were discovered by Obermeier about nine years ago in the blood of persons suffering from relapsing fever, and their presence has been, pretty generally, considered as pathognomic of the malady.

4. I examined repeatedly the blood of about 25 fever patients during my stay in Bombay, and was able to detect these spirilla in the blood of five; but with regard to the character of the fever from which these five persons suffered I could see no well-marked feature which would be sufficient to distinguish it from the class of fevers usually referred to as "remittent" in this country. In none of these five cases could it be said that their temperature charts clearly presented the characters ordinarily given as typical of relapsing fever.

5. It will be more convenient to consider the question of the relation which the spirilla in the blood may bear to the fever under consideration when similar examinations of the blood of fever patients will have been made in Calcutta and elsewhere, and after comparison with the results of my colleague's (Dr. D. D. Cunningham) inquiries in Madras.

6. With regard to the supposed infectious character of the fever, as it at present exists in Bombay, I can only say that I failed to convince myself that anything like sufficiently satisfactory evidence existed for any such inference; nor could I satisfy myself, so far as the patients at present in hospital were concerned, that any direct causitive relation existed between the fever and the famine. The fever patients seen by me had, nearly all of them, been resident in Bombay for more than six months—certainly in not one of the five cases in which I observed the spirillum could the origin of the fever been directly attributed to want.

7. As I understand that Surgeon-General Hunter will shortly submit a full report regarding the clinical and other features of this fever, it is not deemed necessary that any attempt should be made here to give more than a general outline of the salient points in connexion with it.

8. On a future occasion Dr. Cunningham and myself hope to be in a position to submit a detailed account of the more technical features of the inquiry—more especially as regards the diagnostic value of the presence of spirilla in the blood.

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No. 26.

Encl. in No. 37.

EXTRACT from the Proceedings of the Government of Madras, Revenue Department, No. 1,830, dated 28th May 1877.

His Grace in Council finds from the reports of various officers that a strong dislike prevails amongst the distressed poor in villages to removal to the relief camps provided for their use at convenient centres. The Governor in Council, moreover, fears that the system now in force tends to induce and foster those wandering and unhomely habits amongst the distressed, which render the distress more difficult to detect and more costly to relieve; habits which it is on every account most desirable to discourage and check.

2. His Grace in Council, therefore, authorises all Collectors to make arrangements to relieve, in their respective villages, any distressed persons who are fit objects for transmission to a relief camp, but are reluctant to leave their homes, and to issue to them, so long as they need it, a continuous daily money-dole through the village officers instead of removing them to central camps.

3. The head of the village will be directed to enter the names and circumstances of all such persons in a register, and to relieve them at the rates herein-after provided, until the arrival of the village inspector. Each case will then be carefully inquired into by that officer; and if worthy of continued relief a ticket will be issued to the distressed person authorising him to receive from the village head the sanctioned daily money-dole. The name of the recipient, his number on the register, the date of his admission to relief, and the name of his village should be entered on the ticket. The dole should be issued daily not later than 8 a.m. The village inspector will be instructed to inspect each recipient on his first and subsequent visits, and to report any change for the worse or other casualty; to satisfy himself, on the one hand, that the dole has been properly and regularly paid, and on the other that no undeserving cases have been added to or allowed to remain on the register.

4. The inspector will be required to sign the register and the recipients' tickets on each visit. The inspector will also satisfy himself as to the current price of food grains, and report to the Collector any material change which he may ascertain, adding any remarks regarding the conduct of the payment arrangements which he may consider necessary.

5. His Grace in Council further authorises Collectors and officers in charge of relief-camps to arrange for the transmission to their homes of such inmates as desire to return to them, with their families, if they are in a fit state of health to proceed beyond the reach of the medical aid and special relief provided at the relief centres. The same provision may be extended to distressed persons seeking admission to camps and relief houses without requiring residence.

6. It will probably suffice, as respects villages within the same district, for the officer in charge of the camp or relief house to grant certificates, accompanied by sufficient food or batta for the road, addressed to the heads of the villages from which the inmates come, authorising them to enter the distressed persons in their lists, and to issue to them the daily money-dole on arrival in their respective villages. Notice should at the same time be sent to the Tahsildars of the taluks in which the villages are situated for transmission to the village inspector of the circles, whose duty it should be to visit forthwith any village to which any considerable number of distressed persons are so relegated, and satisfy himself of the propriety of their claims. When the number is small this inspection will take place in the ordinary course of the inspector's tour.

7. When persons belonging to adjacent districts have collected in relief camps and centres, and are desirous to return to their own districts and villages, and there receive the village money-dole, arrangements will be made, through the officials of the district in which are situated the villages to which the inmates wish to return, for their safe transit to their respective villages, the necessary batta for the journey being supplied by the officer in charge of the camp or centre.

8. His Grace the Governor in Council resolves to authorise officers to issue the money doles at not less than:—

Anna 1–2 for each adult, male or female; and
„ 0–6 for each child below 12 years of age.

These rates may require to be raised in case of any material change in price of food grain.

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9. District and divisional officers are specially directed to watch the effect of this concession, and to state the results in their fortnightly narratives.

Encl. in No. 51.

No. 27.

Dated Bombay, the 28th May 1877.

From Mr. C. E. Buckland, Private Secretary to his Excellency the Governor of Bombay, to the Additional Secretary to the Government of India.

I am desired by his Excellency Sir R. Temple to forward the accompanying memorandum on the subject of remissions.

Encl. in No. 79.

No. 28.

Dated Madras, 30th May 1877.

From Surgeon-Major W. R. Cornish, F.R.C.S., Sanitary Commissioner for Madras, to the Additional Secretary to the Government of Madras, Revenue Department.

In the "Gazette of India" of the 19th instant, I observe a further communication from the Honourable Sir R. Temple, Bart., K.C.S.I., in regard to the sufficiency or otherwise of one pound of grain as the basis of wages for adults on famine relief works. The letter to which I refer (No. 340E. of the 10th May 1877) is accompanied by a "memorandum,"* drawn up by Surgeon-Major J. B. Lyon, F.C.S., Chemical Analyser to the Government of Bombay, and to which memorandum is appended numerous tables for the construction of dietaries for natives of India, according to the weights of individuals.

2. I would crave the permission of his Grace in Council briefly to state that, in my opinion, the data of Surgeon-Major Lyon's paper do not justify the conclusion which Sir Richard Temple has founded on it, viz., that "a ration based on a pound of grain is "sufficient for the sustenance of persons not performing severe labour." I cannot find any statement in Mr. Lyon's paper in which he expresses such an opinion in words, although a casual reader may perhaps draw some such conclusion from his figures.

3. In all the scales of diet drawn up by Surgeon-Major Lyon, he has proceeded on the assumption that "there is no theoretical objection to the proposition that the quantity "of food required by adults is proportionable to their weight, provided, of course always "that the quantity of work expected from them is likewise proportioned to their weight." This method of procedure is in my opinion extremely fallacious, and I shall briefly show why any scale of diet drawn up in furtherance of this view must be received with the greatest caution.

4. Surgeon-Major Lyon argues that a human being requires food in exact proportion to his weight, and he has furnished tables showing, according to this theory, the quantities of nitrogenous and carboniferous food necessary for the sustenance of persons weighing from 80 to 150 lbs., under the different conditions of hard labour, light labour, and complete rest.

5. If there was any relation between the weight of an individual and his capacity for assimilating food, and effecting work requiring expenditure of force, there might be some show of reason for laying down a principle that men require food in proportion to their weight. But we know, as a fact, that there is no such correspondence—that in a very considerable number of persons, the power to work diminishes as the body increases in weight, notably in those who, with increasing years, tend to develop fat instead of muscle.

6. The everyday experience of the most superficial observer must afford instances of persons of large appetite who never get fat, and of persons who are not large eaters who lay on an amount of flesh that becomes a serious burden and inconvenience to them, and with regard to these persons it is apparently seriously proposed by the chemical analyser to the Government of Bombay that they should be fed, the thin and the stout alike, in proportion to their weight. The mere statement of the proposition in this form is suffi-

* See "East India Famine Correspondence, Part III. p. 471."

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cient to show that, without being hedged in by important qualifications, the theory cannot be applied in practical dietetics.*

7. The theory that work can be performed in proportion to weight is still more wide of the field of practical observation. According to this theory "the Claimant," who weighed 22 stones on going to jail, was then more fit to endure hard labour than he was six months after when he had lost one fourth of his weight; and athletes instead of striving to keep their weight down ought, according to this theory, to take means to lay on extra flesh. There is, in fact, no relation between the ability and capacity for labour and mere weight of body, as Mr. Lyon would seem to suggest.

8. There are so many things more important than weight of body, bearing on the necessity for food, that it is surprising to find a chemist in these days laying so much stress on weight as the principal factor in determining the quantities of food necessary for health and strength. One might think that questions connected with the idiosyncrasies of the individual, his age, race, temperament, habit of body, slowness or rapidity of vital changes, were to be set aside as of no value in comparison with a theory that the body needs sustenance in proportion to its bulk. I suppose Mr. Lyon would admit that a very different amount of nutriment is needed for a spare man of large frame, and without fat, and another of equal weight, but whose size depended on an abnormal deposition of fat in his tissues, yet this weight theory makes no distinction between the requirements of the two.

9. Mr. Lyon has taken 150 lbs. as the average weight of male Europeans and 105 lbs. as the average weight of natives of India. According to Sir R. Christison's experiments in Perthshire the average weight of Scotchmen was 140 lbs., and from some experimental measurements and weighings made of various castes by Dr. John Shortt in Madras some years ago, he found that the average weight of male adults of the fishermen, Boyas, and other labouring castes, was about 120 lbs., and of certain other castes from 114 to 118 lbs. It would seem, therefore, that as regards the classes of persons suffering from famine in this part of India, there is not that great difference in weight and bulk, of the people as a whole, which would justify a very marked reduction of food in comparison with European diets.

10. The argument in regard to food, and average weight and bulk of the body must not be pushed too far. With certain limitations it must be admitted as useful in the construction of dietaries, but after all, the facts of most importance are, (1) the habits of the people themselves in the choice of food, its nature and amount; and (2) the daily waste which the body suffers from vital changes. Observations on the former head are sufficiently accurate, but in India we have never had any scientific determination of the daily waste of the body under strictly defined conditions of diet and labour. The subject is so important that I hope some of our scientific officers, who have leisure and means of observation, will take it up, and let us know if there be any truth in Sir Richard Temple's surmise, that natives of India excrete less nitrogen in proportion to weight, food, and exercise than the European races do.

11. There can be no question as to the capacity of the labouring classes of India for hard work, provided they get food in amount and quality to satisfy their necessities,

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* NOTE.—The physiological needs of men whose tendency it is to clothe themselves with flesh, and of those who remain thin and spare in spite of all the food they consume, are essentially different. The two types and their personal characteristics have been well defined by Shakespeare, who makes Julius Cæsar say to Mark Antony—

Cæs.—"Let me have men about me that are fat;
"Sleek headed men, and such as sleep o'nights.
"Yond Cassius has a lean and hungry look,
He thinks too much; such men are dangerous."
Ant.—Fear him not Cæsar, he's not dangerous!
* * * * *
Cæs.—"Would he were fatter! * *
I do not know the man I should avoid
So soon as that spare Cassius. He reads much;
He is a great observer, and he looks
Quite through the deeds of men: he loves no plays
As thou dost, Antony! he hears no music!
Seldom he smiles, and smiles in such a sort,
As if he mocked himself, and scorned his spirit
That could be moved to smile at any thing.
Such men as he be never at heart's ease,
Whiles they behold a greater than themselves,
And therefore are they very dangerous."

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While our streets are lined with miserable scare-crows of humanity, who have scarcely vitality enough to drag themselves along, there may be seen on the Madras beach magnificent specimens of working men, whose strength and powers of endurance are not to be surpassed by the like qualities of any other class of people in the world.

12. A common task of four men is to take from the beach and load on a hand-cart 22 bags of rice, each bag weighing 164 lbs. This load they push or drag to the railway station distant more than two miles, unload, returning empty to the beach. Four or five trips of this kind go to an average day's work.

In carrying rice bags from the beach to merchants' warehouses, I find that an average cooly will take up a bag weighing 164 lbs., carry it from 60 to 100 yards over loose, heavy sand, and a further distance of 30 or 40 yards on good road, and up a flight of steps to a loft, and that he will manage 100 of these trips in a day.

13. Work of this nature, I need not observe, is not performed on famine wages even of the highest scale. A cooly engaged in carrying rice from the beach to warehouses, or from the beach to the railway station, can earn 1 rupee or even 1¼ rupee a day, and his diet includes a plentiful supply of meat or fish and ghee, in addition to his rice and curry. Those interested in the study of dynamics might work out the number of "foot tons" lifted or moved in the course of a day by the Madras beach coolies, and from this data estimate the amount of food necessary for the production of the requisite force, but practically we know that labour of this class can only be followed by those in full strength and health, and that it could not be accomplished without a liberal diet, such as men earning a rupee a day can well afford themselves.

14. I observe that Surgeon-Major Lyon bases his tables of diets on the experience of the Bombay house of correction, where it is stated that the prisoners on hard labour gained in weight on the average 1 lb. 10¼ ozs. each, while existing on the scale of food for labouring prisoners. I admit that the increase or decrease in weight of the people subjected to a dietary, with certain reservations and limitations, affords indications of value, regarding the sufficiency of the food, but the weight record alone is only a portion of the evidence necessary. Surgeon-Major Lyon says nothing about the sickness and mortality of the prisoners in the Bombay house of correction. It would be essential to know to what extent they suffered from bowel disorders, anœmia, scurvy, and other diseases of innutrition, as well as the general rate of mortality, before coming to the conclusion, that the hard-labour scale of diet was actually sufficient to keep the people in ordinary health. As regards the proposed diets for those on light labour and those doing nothing at all, there appears to be no practical evidence whatever to prove their sufficiency or insufficiency, and all that can be said of such scales is that they are based on a theory, which in some respects has been shown to be fallacious.

15. As a matter of fact and excluding all theory whatever, we have ascertained in certain Madras gaols, that where punishment by restrictions in food, so as to reduce the daily amount of nitrogen to much less than 200 grains, has been persevered in for any length of time, there has been loss of strength, loss of health, and sacrifice of life, and this knowledge would make me very sceptical as to the sufficiency of a "bare subsistence" diet, containing only 136·7 grains of nitrogen, such as Mr. Lyon now proposes. In his table of "Food Equivalents," published a few years ago, I observe that Mr. Lyon was more liberal in his views, for he there speaks of 200 grains of nitrogen, and 3,079 grains of carbon as "almost a starvation diet." Certainly, without the most cautious experimental tests, a dietary like the No. 3 scale of Mr. Lyon would never commend itself to those practically acquainted with the subject of the connection of food with vital force, and based as it is on mere theory, I think it is to be regretted that a subsistence ration, ranging in nitrogen from 104·2 to 195·3 grains according to the weight of the individual, was ever seriously put forward as a practical guide for those dealing with famine relief.

16. There is one other point requiring a cursory notice. Mr. Lyon proposes to eke out the deficient nitrogen of various cereal grains by the addition of pulse, so as to make the total nitrogen of the food equivalent to the needs of the body, as reckoned by the weight theory.

To take, for instance, the case of an obese native merchant accustomed to feed on rice, and sentenced to hard labour. His daily diet would be made up of 21 ounces of rice, and 9·55 ounces of gram or dhall. In all probability he would be unused to the latter food, and certainly, under no circumstances, could he digest and assimilate the nutriment contained in 9·55 ounces of that grain in the course of 24 hours. If he failed to digest the dhall the nitrogenous principles of it could in no way assist in the nutrition

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of the body. In these proposed dietaries Mr. Lyon has, in fact, omitted the very necessary caution enjoined in his former paper on "Food Equivalents." "Regard should "always be paid to the relative proportions in which, by custom or habit, articles of "food are consumed by a population. This often indicates a limit of digestibility "which ought not to be greatly exceeded."

17. The present period of famine is presenting many opportunities for the study of those conditions of the body induced by privation of food. And the more this subject is considered, the more important does it become that we should follow only sound and true principles. in dealing with questions connected with the food of a community.

18. A careful study of the condition of the people who have been subjected to slow starvation, shows that there is a point in the downward progress of such cases from which there is no possible return to health and strength. Food of the most nutritious character, and in the greatest profusion, is then powerless to save life. Chemical theories as to the composition of food do not in the least help us to explain why people should die, with an abundance of nutritious food within reach, but if we carefully examine the bodies of those who have died of this form of starvation, we shall find that the delicate structures engaged in the assimilation of nutriment from food, have wasted (owing probably to insufficient use) and undergone degenerative changes, so as to unfit them for their peculiar office. It has been my painful duty to observe, not one or two, but many thousands of such cases, within the last few months, and I need not say that the contemplation of the causes leading to these slow, but almost certainly fatal, changes in the assimilative structures of the human body, lead me to look with very grave suspicion upon all proposals for "bare subsistence" dietaries; and especially when such proposals are known to be out of harmony with the natural habits and customs of the people to whom they are proposed to be applied.

19. This is not the time, nor the occasion, to review the practical effects of Sir Richard Temple's experiment in reducing the famine-wages of the people to the basis of 1 lb. of grain, but this much may be stated, that the recent experience of nearly every famine officer who has observed the practical effects of the reduced wages has led him to believe, and publicly record his opinion, that the subsistence scale of wages was perilously low. While as regards our destitute poor in relief camps we have had too abundant evidence of the fact, that a more liberal scale of food than that purchasable for a famine relief wage is inadequate to restore health, or to arrest decay.

No. 29.

Encl. in No. 79.

Dated Bombay, the 1st June 1877.

From Surgeon-Major W. Dymock to the Editor of the Bombay Gazette.

As there has been a good deal of discussion lately upon the amount of aliment required for a bare subsistence diet, perhaps some of your readers may be interested by a short account of the experiences of the French during the siege of Paris. The observations made at that time concerning the effect of a reduced dietary upon the Mobiles serving in the trenches are particularly valuable, as the men were all under complete control both as regards their official rations and the extras they were allowed to purchase. The following particulars are gathered from Armand Gautres's valuable work on chemistry as applied to physiology, pathology, and hygiene. After mentioning that for people leading a sedentary life 0·2 grammes of nitrogen and 4·202 of carbon per kilogram of body weight daily, have generally been accepted as a sufficient allowance for the maintenance of a perfect state of health, he says that the average weight of the Mobiles was 63 kilos (138 lbs. 12¾ oz.), and that these men being employed upon severe duties in the trenches during winter months, and receiving only 12·5 grammes of nitrogen and 263 of carbon per diem preserved generally a good state of health. Upon this he remarks, that the generally accepted bare subsistence ration would appear to be a little too liberal.

As the nature of the aliments used is a matter of importance, the diet table of the Mobiles is particularly valuable as a standard of a liberal bare subsistence ration in a temperate climate.

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Diet Table.

They received daily.	Weight of food.	Dry protein matters.	Hydrates of carbon.	Fatty matters.
Fresh meat (if preserved, 100 grammes) - -	175	33·25	—	3·15
Rice or beans - - - - - -	80	5·14	62·04	0·34
Bread - - - - - -	250	18·75	132·70	0·75
Biscuits - - - - - -	250	22·49	159·20	2·09
Coffee ration - - - - -	30	3·30	12·50	—
„ purchased - - - - -	25			
Sugar ration - - - - -	20	—	40·	—
„ purchased - - - - -	20			
Wine - - - - - -	125	—	—	1·25
Brandy - - - - - -	75	—	—	0·30
Grammes -	—	82·93	406·44	49·83

From this table we may draw the following conclusions :—

Proportion of nitrogenous substances to hydrates of carbon and fatty matters.

:: 1 : 4·9 : 0·6

Quantity of nitrogen supplied in 24 hours, 12·5 grammes.

Quantity of carbon { Protein matters 44 grammes; Hydrates of carbon 181 „; Fat - - 38 „ } Total 263 grammes.

In order to adapt this dietary to natives of India, we should omit all or part of the meat, insert dâl for rice or beans, increase the bread, omit coffee, wine, and brandy, and insert oil and condiments.

Encl. in No. 103.

No. 30.

Imports of Grain into the Presidency of Madras, and its Transport by the Madras Railway.

Proceedings of the Madras Board of Revenue, dated 1st June 1877.

The additions to the food-stocks of the presidency by importations by sea from places beyond the presidency between 1st May 1876 and 30th April 1877, were as shown below :—

Months.	Imports.	Exports.	Net additions to the food-stocks.
	Tons.	Tons.	Tons.
May 1876 - - - -	16,967	9,045	+ 7,922
June „ - - - -	12,283	13,695	— 1,412
July „ - - - -	3,908	11,134	— 7,226
August „ - - - -	3,795	11,118	— 7,323
September „ - - - -	6,109	7,920	— 1,811
October „ - - - -	10,830	9,740	+ 1,090
November „ - - - -	34,746	5,879	+ 28,867
December „ - - - -	52,311	1,872	+ 50,439
January 1877 - - - -	99,923	2,992	+ 96,931
February „ - - - -	86,818	4,739	+ 82,079
March „ - - - -	87,422	5,728	+ 81,694
April „ - - - -	93,379	3,438	+ 89,941
Total - -	508,491	87,300	+ 421,191
1875–76 -	73,394	142,063	— 68,669

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2. The imports are chiefly from Bengal and the exports to Ceylon. The following statement shows the places whence the imports were received :—

	Tons.
Bengal - - - - - -	354,823
Bombay - - - - - -	68,712
British Burmah - - - - -	63,170
Scinde - - - - - -	7,022
Foreign ports in other presidency - - -	6,363
Ditto beyond India - - -	8,401
	508,491

3. The information available in regard to the imports by land is not complete. There is no record of the cart traffic, and the records available do not show the imports by rail prior to August 1876. The grain-trade by land, however, from and to places beyond the presidency is, the Board believe, ordinarily so very small that the railway exports and imports from August, which are shown below, may be regarded as the trade for the entire period from April 1876 :—

Months.		Imports.		Exports to the Mysore Country.	Net additions.
		From G. I. P. Railway.	From the Mysore Country.		
		Tons.	Tons.	Tons.	Tons.
August	1876 - - -	4,039	157	3,049	+ 1,147
September	„ - - -	5,163	79	6,173	— 931
October	„ - - -	4,921	101	14,485	— 9,463
November	„ - - -	7,951	282	10,194	— 1,961
December	„ - - -	12,281	248	11,515	+ 1,014
January	1877 - - -	7,872	79	12,072	— 4,121
February	„ - - -	10,665	118	9,220	+ 1,563
March	„ - - -	8,226	—	15,484	— 7,258
April	„ - - -	9,583	—	14,909	— 5,326
	Total - -	70,701	1,064	97,101	— 25,336

4. Thus the total *net* imports from places beyond this presidency from 1st May 1876 to 30th April 1877 is 395,855* tons.

	Tons.
* By sea -	+ 421,191
By land	— 25,336
Difference -	395,855

5. As regards the additions to the food stocks in the distressed districts, the only information available relates to the imports by sea and the traffic on the Madras Railway. The returns for the South Indian Railway are not complete, being for quarters and extending to December 1876 only; and even for the Madras Railway the Board have been able to obtain returns only from August 1876. The Consulting Engineer has been requested to furnish the necessary information for earlier months of 1876, and it will be submitted when received. Meanwhile, the Board think it will be useful to submit the information available, though it is incomplete.

6. The accompanying statements show (1) the imports and exports by sea into and from each district and for each month from 1st April 1876 to 30th April 1877, and the net result for each district. (2.) Ditto by the Madras rail from 1st August 1876 to 30th April 1877, and the net result for each district. The total of the figures now given to 31st March do not agree with Captain Bisset's statements, Nos. II. and III., partly, it is believed, because his statements do not include traffic from Malabar (except Beypore), Mysore, Cuddapah, Beliary, and Kurnool, which is of small amount; and partly because, either from misprints or arithmetical error, the cross and vertical totals in the statements do not agree. The Board have followed his No. I. statement for the March traffic. The Madras Railway returns are also imperfect; in that they do not show traffic from that line to the South Indian Railway. (3.) Ditto by the South Indian rail for the quarters ending June, September, and December 1876, and for April 1877 and the net result for each district.

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7. From these statements it will be seen that the net additions to the food stocks in the distressed districts, by sea and by the Madras rail from 1st August 1876 to 30th April 1877, were in tons as shown below:—

Months.	Kistna.	Nellore.	Cuddapah.	Bellary and Kurnool.	Madras and Chingleput.	North Arcot.	South Arcot.	Madura.	Tinnevelly.	Coimbatore.	Salem.	Total.
1876.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
August - -	− 7,296	− 1,135	+ 703	+ 2,942	+ 11,307	− 1,008	− 793	− 116	+ 1,891	+ 1,561	+ 103	+ 8,159
September - -	− 5,112	− 235	+ 646	+ 4,267	+ 8,603	+ 696	− 846	− 46	+ 1,675	+ 1,109	+ 664	+ 6,421
October - -	− 2,595	- -	+ 1,763	+ 7,731	+ 7,975	− 552	− 892	+ 307	+ 1,593	− 1,021	− 108	+ 14,201
November - -	+ 154	- -	+ 4,210	+ 14,615	+ 26,844	− 501	- -	+ 333	+ 239	− 1,412	+ 232	+ 44,714
December - -	+ 542	+ 2,620	+ 9,702	+ 19,992	+ 25,497	+ 5,285	+ 1,858	+ 1,712	+ 1,360	+ 1,405	+ 3,810	+ 73,783
1877.												
January - -	+ 420	+ 5,899	+ 8,485	+ 16,802	+ 48,548	+ 4,462	+ 2,536	+ 1,366	+ 2,694	+ 2,237	± 3,966	+ 97,435
February - -	+ 205	+ 5,587	+ 9,200	+ 12,023	+ 48,895	+ 3,533	+ 2,613	+ 578	+ 3,065	+ 3,338	+ 3,460	+ 92,497
March - -	− 806	+ 3,531	+ 8,209	+ 14,208	+ 11,793	+ 4,789	+ 6,099	+ 2,459	+ 8,374	+ 3,221	+ 5,492	+ 67,369
April - - -	+ 617	+ 8,549	+ 5,078	+ 16,657	+ 7,687	+ 2,733	- -	+ 5,327	+ 9,678	+ 8,073	+ 5,238	+ 69,637
Total - -	− 13,871	+ 24,816	+ 47,996	+109,237	+192,149	+ 19,437	+ 10,575	+ 11,920	+30,569	+18,511	+22,877	+474,216
Particulars—												
By sea - -	− 13,871	+ 24,816	- -	- -	+368,508	- -	- -	+ 11,920	+30,569	- -	- -	+432,517
By the Madras rail -	- -	- -	+ 47,996	+109,237	−176,359	+ 19,437	+ 10,575	- -	- -	+18,511	+22,877	+ 41,699
	− 13,871	+ 24,816	+ 47,996	+109,237	+192,149	+ 19,437	+ 10,575	+ 11,920	+30,569	+18,511	+22,877	+474,216

The traffic by the South Indian Railway up to December was not, in its net result, of very great importance, and the figures are entirely omitted above.

It will be noticed that the Kistna has been a supplying district, and the extent to which this has been the case is far greater than is represented by the figures above given, as very large quantities passed from the district by land into Nellore and Kurnool. In August and September Nellore was still exporting by sea, but this ceased, and after the two months of October and November, when native vessels could not ply, imports by sea set in. Large quantities have also been sent from Madras to Nellore by road and canal. The North and South Arcot, Madura, and Coimbatore districts were also in the earlier months exporting districts. The imports by rail into Cuddapah, Bellary, and Kurnool were highest in December. In the first-named district they have been falling since March, perhaps owing to harvesting of spring crops under wells; while in Bellary and Kurnool they fell in January and February, and have been since rising. The high prices in December may have, to some extent, brought out local stocks. It is probable that much of the South Arcot imports have passed on into Salem.

8. The food-stocks received in the distressed districts were supplied chiefly from Madras from the imports from Bengal and the northern parts of this presidency. The imports and exports into and from Madras in each of the months from August 1876 are detailed below:—

——	Imports.	Exports.	Difference or quantity retained for consumption.
	Tons.	Tons.	Tons.
August 1876 - -	14,606	3,299	+ 11,307
September „ - -	10,315	6,712	+ 3,603
October „ - -	19,048	11,073	+ 7,975
November „ - -	40,052	13,208	+ 26,844
December „ - -	56,251	30,754	+ 25,497
January 1877 - -	76,168	27,620	+ 48,548
February „ - -	69,200	20,305	+ 48,895
March „ - -	48,469	36,676	+ 11,793
April „ - -	41,824	34,137	+ 7,687
TOTAL - -	375,933	183,784	+192,149
Particulars—			
By sea - - -	374,002	5,494	+368,508
By rail - - -	1,931	178,290	−176,359
	375,933	183,784	+192,149

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This quantity, 192,149 tons, is retained for consumption in Madras and tracts easily accessible thence by cart, viz., Chingleput, Nellore, and part of North Arcot. Large quantity has been sent to Nellore.

9. The additions to the food-stocks distributed on the population of the districts concerned show the following results :—

Districts.	Net Imports.	Population.	Rate per 1,000 for 11 months.
	Tons.		Tons.
Kistna - - -	— 13,871	1,452,374	—
Nellore - - -	+ 24,816	1,376,811	2
Cuddapah - -	+ 47,996	1,351,194	3·9
Bellary - - -	+109,237	1,668,006	4·6
Kurnool - - -		959,640	

District.	Net Imports.	Population.	Rate per 1,000 for 11 months.
	Tons.	No.	Tons.
Madras and Chingleput - -	+192,149	1,254,879	17
North Arcot - - -	+19,437	2,015,278	1
South Arcot - - -	+10,575	1,755,817	·7
Madura - - -	+11,920	2,266,615	·6
Tinnevelley - - -	+33,569	1,693,959	2
Coimbatore - - -	+18,511	1,763,274	1·2
Salem - - - -	+22,877	1,966,995	1.2
Total - -	+474,543	19,524,842	2·7

These results are largely tainted with error, as the land traffic is not included, but are nevertheless, to some extent, instructive, especially those for Bellary, Kurnool, and Cuddapah. At 1½ lbs. per head per diem, which taking rich and poor together, considering that some of the sea-imported grain is paddy, is a low estimate; 1,000 persons will eat 20·1 tons in a month of 30 days. For Bellary, Cuddapah, and Kurnool, therefore, it may be stated that from one-fifth to one-fourth of the population are fed on imported grain. As a good deal of the rail-borne grain has gone from these districts into Mysore and Hyderabad, the lower proportion is perhaps more likely to be correct.

10. With reference to the remark in paragraph 2 of Sir Richard Temple's Minute, that the imports prior to November 1876 into the town of Madras were at first erroneously assumed by him to be inconsiderable on data published by the Madras Board of Revenue, the Board beg to observe that they are not aware of having published any returns showing the trade of the Madras port. Sir Richard Temple has probably taken his figures from the returns published by the Chamber of Commerce, which do not come under the review of the Board; but it is not apparent how the mistake was made, as the places whence the imports come are recorded in the statements, and ports within the presidency are not included.

(Signed) H. E. STOKES,
Secretary.

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Movement of Food grains by South Indian Railway, forwarded from :—

—	Madras Railway.	Tanjore.	Trichinopoly.	Madura.	Tinnevelly.	Coimbatore.	Chingleput.	North Arcot.	Total.
1876.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
2nd quarter - -	1,804	5,648	969	1,670	327	112	- -	14	10,544
3rd „ - -	4,862	4,917	1,699	2,097	857	536	- -	3	14,971
4th „ - -	10,098	10,096	1,490	1,192	4,168	368	7	4	27,423
Total -	16,764	20,661	4,158	4,959	5,352	1,016	7	21	52,938
January to March 1877 -	- -	- -	- -	Statement not received.					
1st to 28th April 1877 -	2,122	11,065	- -	- -	4,340	-	Cuddalore 54	—	17,581

Movement of Food grains by South Indian Railway, net Imports.

—	Madras Railway.	Tanjore.	Trichinopoly.	Madura.	Tinnevelly.	Coimbatore.	Chingleput.	North Arcot.	Remarks.
1876.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	
2nd quarter - -	− 1,804	+ 831	− 652	−1,345	+1,796	+ 923	+ 207	+44	* This quantity is distributed amongst South Indian Railway Districts.
3rd „ - -	− 4,862	+1,507	− 428	− 985	+2,101	+2,304	+ 354	+ 9	
4th „ - -	− 9,990	−1,930	+4,897	+5,085	−1,391	+2,554	+ 761	+14	
Total - -	−16,656*	+ 408	+3,817	+2,755	+2,506	+5,781	+1,322	+67	

Movement of Food grains by South Indian Railway, received at

—	Madras Railway.	Tanjore.	Trichinopoly.	Madura.	Tinnevelly.	Coimbatore.	Chingleput.	North Arcot.	Total.
1876.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
2nd quarter - -	- -	6,479	317	325	2,123	1,035	207	58	10,544
3rd „ - -	- -	6,424	1,271	1,112	2,958	2,840	354	12	14,971
4th „ - -	108	8,166	6,387	6,277	2,777	2,922	768	18	27,423
Total - -	108	21,069	7,975	7,714	7,858	6,797	1,329	88	52,938
January to March 1877 -	- -	- -	- -	Returns not received.					
1st to 28th April 1877 -	1,349	- -	- -	16,232	- -	- -	- -	- -	17,581

Madras, 1st June 1877.

(Signed) H. E. STOKES,
Secretary.

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Net Imports by Sea.

Months.	Ganjam.	Vizagapatam.	Godavery.	Kistna.	Nellore.	South Arcot.	Tanjore.	Madura.	Tinnevelly.	South Canara.	Malabar.	Madras.	Total.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
May 1876	− 3,489	+ 798	− 4,174	− 2,832	—	− 614	− 1,723	+ 2,063	+ 835	− 437	+ 11,895	+ 5,220	+ 7,587
June „	− 683	+ 745	− 5,096	− 8,144	− 2,050	−2,079	− 8,820	+ 1,396	+ 520	+ 1	+ 9,854	+ 7,868	− 6,488
July „	− 287	+ 71	− 5,972	− 7,565	− 2,300	−1,780	− 5,602	− 407	+ 1,140	—	+ 568	+ 15,704	− 6,430
August „	− 1,293	+ 818	− 8,744	− 7,296	− 1,135	− 793	− 7,128	− 116	+ 1,891	+ 16	+ 1,932	+ 13,976	− 7,872
September „	− 980	+1,155	− 5,842	− 5,112	− 235	− 846	− 3,804	− 46	+ 1,675	− 166	+ 4,756	+ 9,665	+ 220
October „	− 172	− 287	−13,861	− 2,595	—	− 892	− 5,888	+ 307	+ 1,593	− 586	+ 7,278	+ 18,699	+ 3,596
November „	− 902	− 907	−12,253	+ 154	—	—	− 5,162	+ 333	+ 239	− 3,978	+ 8,649	+ 39,684	+ 25,862
December „	− 6,512	−1,639	−17,112	+ 542	+ 2,620	+1,858	− 1,050	+ 1,712	+ 1,360	− 4,970	+ 12,488	+ 56,135	+ 45,382
January 1877	− 6,272	−1,340	−10,988	+ 420	+ 5,899	+2,536	− 766	+ 1,366	+ 2,694	− 1,793	+ 27,666	+ 75,582	+ 94,954
February „	−15,248	−1,835	− 4,570	+ 205	+ 5,587	+2,613	− 1,677	+ 578	+ 3,065	− 877	+ 21,625	+ 68,865	+ 78,331
March „	−11,903	−1,746	− 2,842	− 806	+ 3,581	+6,099	+ 352	+ 2,459	+ 8,374	− 824	+ 27,844	+ 46,464	+ 77,002
April „	− 4,328	− 544	− 1,192	+ 617	+ 8,549	—	+10,787	+ 5,327	+ 9,678	− 2,845	+ 34,327	+ 39,488	+100,364
Total	−52,019	−4,716	−92,646	−32,412	+20,466	+6,102	−30,481	+14,972	+33,064	−15,954	+168,832	+397,300	+412,508

Exports by Sea.

Months.	Ganjam.	Vizagapatam.	Godavery.	Kistna.	Nellore.	South Arcot.	Tanjore.	Madura.	Tinnevelly.	South Canara.	Malabar.	Madras.	Total.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
May 1876	3,489	32	4,260	2,832	85	674	4,462	97	38	748	494	20	17,281
June „	690	12	5,096	8,353	2,054	2,129	9,839	452	27	—	93	72	28,817
July „	287	14	5,972	7,565	2,306	2,581	6,967	566	9	—	—	257	26,524
August „	1,293	61	8,744	7,296	1,196	1,383	7,547	211	10	16	70	201	28,028
September „	996	112	5,846	5,112	288	1,302	5,601	291	3	280	211	322	20,364
October „	172	497	13,861	2,642	—	1,513	6,818	134	24	798	1,572	115	28,146
November „	902	907	12,253	118	—	—	5,678	24	171	4,282	3,078	—	27,408
December „	6,512	1,643	17,112	174	3	—	1,660	191	1	5,691	4,447	9	37,443
January 1877	6,272	1,399	11,049	53	—	—	1,243	276	71	3,330	7,487	435	31,615
February „	15,248	1,837	4,609	230	—	74	3,713	56	28	1,591	5,009	192	32,587
March „	11,903	1,099	2,935	1,506	264	50	5,039	557	26	1,526	6,897	1,929	34,531
April „	4,328	857	1,673	69	179	—	2,455	1,032	16	2,787	6,385	2,291	22,072
Total	52,042	9,270	93,510	35,950	6,875	9,706	61,022	3,887	424	21,049	35,738	5,843	334,816

Madras, 1st June 1877.

(Signed) H. E. STOKES, Secretary.

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Imports by Sea.

Months.	Ganjam.	Vizagapatam.	Godavery.	Kistna.	Nellore.	South Arcot.	Tanjore.	Madura.	Tinnevelly.	South Canara.	Malabar.	Madras.	Total.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
May 1876	—	825	186	—	85	60	2,739	2,160	873	311	12,389	5,240	24,868
June „	7	757	—	209	4	50	1,019	1,848	547	1	9,947	7,940	22,329
July „	—	85	—	—	6	801	1,865	159	1,149	—	568	15,961	20,094
August „	—	879	—	—	61	590	419	95	1,901	32	2,002	14,177	20,156
September „	16	1,267	4	—	53	456	1,797	245	1,678	114	4,967	9,987	20,584
October „	—	210	—	47	—	621	980	441	1,617	212	8,850	18,814	31,742
November „	—	—	—	272	—	—	516	357	410	309	11,722	39,684	53,270
December „	—	4	—	716	2,623	1,858	610	1,903	1,361	721	16,885	56,144	82,825
January 1877	—	59	61	473	5,899	2,536	477	1,642	2,765	1,537	35,153	75,967	126,569
February „	—	2	39	435	5,587	2,687	2,036	634	3,093	714	26,634	69,057	110,918
March „	—	153	98	700	3,795	6,149	5,391	3,016	8,400	702	34,741	48,398	111,533
April „	—	313	481	686	8,728	—	13,242	6,359	9,694	442	40,712	41,779	122,436
Total	23	4,554	864	3,538	26,841	15,808	30,541	18,859	33,488	5,095	204,570	403,143	747,324

Movements of Food-grains by the Madras Railway.

Months.	Net Imports.										Remarks.
	Madras or Chingleput District.	Great Indian Peninsula Railway, including Raichore.	South Indian Railway, including Conjeveram.	North Arcot District.	Salem District.	Coimbatore District.	Malabar District.	Mysore Territory.	Cuddapah District.	Bellary and Kurnool Districts.	
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	
August 1876	− 2,669	− 4,039	− 1,573	− 1,008	+ 103	+ 1,561	+ 1,088	+ 2892	+ 703	+ 2,942	* This quantity was received from the South Indian Railway for distribution by the Madras Railway, and is included in the quantities above shown as distributed amongst Madras Railway districts.
September „	− 6,062	− 5,163	− 2,030	+ 696	+ 664	+ 1,109	− 221	+ 6,094	+ 646	+ 4,267	
October „	− 10,724	− 4,921	− 5,124	− 552	− 108	− 1,021	− 1,428	+14,384	+ 1,768	+ 7,781	
November „	− 12,840	− 7,951	− 2,432	− 501	+ 232	− 1,412	− 3,833	+ 9,912	+ 4,210	+ 14,615	
December „	− 30,638	−12,281	− 1,837	+ 5,285	+ 3,810	+ 1,405	− 7,205	+11,267	+ 9,702	+ 19,992	
January 1877	− 26,984	− 7,872	− 1,151	+ 4,462	+ 3,986	+ 2,237	−11,958	+11,993	+ 8,485	+ 16,802	
February „	− 19,970	−10,665	− 481	+ 3,583	+ 3,460	+ 3,338	− 9,540	+ 9,102	+ 9,200	+ 12,023	
March „	− 34,671	− 8,226	− 1,209	+ 4,789	+ 5,492	+ 3,221	− 7,297	+15,484	+ 8,309	+ 14,208	
April „	− 31,801	− 9,583	− 773	+ 2,733	+ 5,238	+ 8,073	−10,531	+14,909	+ 5,078	+ 16,657	
Total	−176,359	−70,701	−16,110*	+19,437	+22,877	+18,511	−50,925	+96,037	+47,996	+109,287	

Madras, 1st June 1877.

(Signed) H. E. STOKES, Secretary.

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Movements of Food-grains by the Madras Railway.

Months.	Received at: Madras or Chingleput District.	North Arcot District.	Mysore Territory.	Salem District.	Coimbatore District.	Malabar District.	Cuddapah District.	Bellary and Kurnool Districts.	South Indian Railway.	Total.	Remarks.
1876.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	
August	429	653	3,049	642	1,667	2,169	782	3,359	—	12,750	The monthly abstracts furnished do not show quantities sent from the Madras to the South India Railway. The quantity entered for the month of April is got from the weekly statements published on the "Fort St. George Gazette." The quantity was considerable in the earlier months (*vide* South Indian Railway Abstracts).
September	328	1,949	6,173	1,264	1,238	615	762	5,040	—	17,369	
October	234	1,863	14,485	1,643	925	839	2,641	8,466	—	31,096	
November	368	1,879	10,194	2,183	1,962	1,324	4,760	15,189	—	37,859	
December	107	6,775	11,515	4,475	3,451	868	10,091	21,729	—	59,011	
1877.											
January	201	5,034	12,072	4,908	3,567	966	8,856	20,455	—	56,059	
February	143	4,165	9,220	4,037	3,826	525	9,389	13,614	—	44,919	
March	76	5,056	15,484	5,786	3,612	372	8,209	14,208	—	52,803	
April	45	2,818	14,909	5,382	8,479	447	5,078	16,657	201	54,016	
Total	1,931	30,192	97,101	30,320	28,727	8,125	50,568	118,717	201	365,882	

Movement of Food-grains by the Madras Railway.

Months.	Forwarded from: Madras or Chingleput District.	Great Indian Peninsula Railway, including Raichore.	South Indian Railway including Conjeveram.	Malabar District.	North Arcot District.	Salem District.	Coimbatore District.	Mysore Territory.	Cuddapah District.	Bellary and Kurnool.	Total.
1876.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
August	3,098	4,039	1,573	1,081	1,661	539	106	157	79	417	12,750
September	6,390	5,163	2,030	836	1,253	600	129	79	116	773	17,369
October	10,958	4,921	5,124	2,267	2,415	1,751	1,946	101	878	735	31,096
November	13,208	7,951	2,432	5,157	2,380	1,951	3,374	282	550	574	37,859
December	30,745	12,281	1,337	8,073	1,490	665	2,046	248	389	1,737	59,011
1877.											
January	27,185	7,872	1,151	12,924	572	922	1,330	79	371	3,653	56,059
February	20,113	10,665	481	10,065	632	577	488	118	189	1,591	44,919
March	34,747	8,226	1,209	7,669	267	294	391	—	—	—	52,803
April	31,846	9,583	974	10,978	85	144	406	—	—	—	54,016
Total	178,290	70,701	16,311	59,050	10,755	7,443	10,216	1,064	2,572	9,480	365,882

Madras, 1st June 1877.

(Signed) H. E. STOKES, Secretary.

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Movements of Food-grains by Sea and by the Madras Rail.

	NET RESULTS FOR											
	Places within the Madras Presidency.											
	Districts where there is no distress.							Distressed districts.				
	Ganjam.	Vizagapatam.	Godavery.	Tanjore.	South Canara.	Malabar.	Total.	South Arcot.	Kistna.	Nellore.	Cuddapah.	Bellary and Kurnool.
1	2	3	4	5	6	7	8	9	10	11	12	13
1876.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
August - By rail - -	- -	- -	- -	- -	- -	+1,088	+1,088	- -	- -	- -	+703	+2,942
„ sea - -	— 1,293	+818	—8,744	—7,128	+16	+1,932	—14,399	—793	—7,296	—1,135	—	—
Total -	— 1,293	+818	—8,744	—7,128	+16	+3,020	—13,311	—793	—7,296	—1,135	+703	+2,942
September - By rail - -	- -	- -	- -	- -	- -	—221	—221	- -	- -	- -	+646	+4,267
„ sea - -	—980	+1,155	—5,842	—3,804	—166	+4,756	—4,881	—846	—5,112	—235	—	—
Total -	—980	+1,155	—5,842	—3,804	—166	+4,535	—5,102	—846	—5,112	—235	+646	+4,267
October - By rail - -	- -	- -	- -	- -	- -	—1,428	—1,428	- -	- -	- -	+1,763	+7,731
„ sea - -	—172	—287	—13,861	—5,888	—586	+7,278	—13,516	—892	—2,595	—	—	—
Total -	—172	—287	—13,861	—5,888	—586	+5,850	—14,944	—892	—2,595	- -	+1,763	+7,731
November - By rail - -	- -	- -	- -	- -	- -	—3,833	—3,833	- -	- -	- -	+4,210	+14,615
„ sea - -	—902	—907	—12,253	—5,162	—3,973	+8,649	—14,548	- -	+154	—	—	—
Total -	—902	—907	—12,253	—5,162	—3,973	+4,816	—18,381	- -	+154	- -	+4,210	+14,615
December - By rail - -	- -	- -	- -	- -	- -	—7,205	—7,205	- -	- -	- -	+9,702	+19,992
„ sea - -	—6,512	—1,639	—17,112	—1,050	—4,970	+12,438	—18,845	+1,858	+542	+2,620	—	—
Total -	—6,512	—1,639	—17,112	—1,050	—4,970	+5,233	—26,050	+1,858	+542	+2,620	+9,702	+19,992
1877.												
January - By rail - -	- -	- -	- -	- -	- -	—11,958	—11,958	- -	- -	- -	+8,485	+16,802
„ sea - -	—6,272	—1,340	—10,988	—766	—1,793	+27,666	+6,507	+2,536	+420	+5,899	—	—
Total -	—6,272	—1,340	—10,988	- 766	—1,793	+15,708	—5,451	+2,536	+420	+5,899	+8,485	+16,802

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Movements of Food-grains by Sea and by the Madras Rail—(*continued*).

	NET RESULTS FOR—(*continued*).											
	Places within the Madras Presidency—(*continued*).								Places beyond the Madras Presidency.			Grand Total.
	Distressed Districts—(*continued*).											
	Madras or Chingleput.	North Arcot.	Madura.	Tinnevelly.	Coimbatore.	Salem.	South Indian Railway.	Total.	Great Indian Peninsula Railway.	Mysore Territory.	Total.	
	14	15	16	17	18	19	20	21	22	23	24	25
1876.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
August - By rail - -	−2,669	−1,008	- -	- -	+1,561	+103	−1,573	+59	−4,039	+2,892	−1,147	—
„ sea - -	+13,976	- -	−116	+1,891	- -	- -	- -	+6,527	- -	- -	- -	−7,872
Total -	+11,307	−1,008	−116	+1,891	+1,561	+103	−1,573	+6,586	−4,039	+2,892	−1,147	−7,872
September - By rail - -	−6,062	+696	- -	- -	+1,109	+664	−2,030	−710	−5,163	+6,094	+931	—
„ sea - -	+9,665	- -	−46	+1,675	- -	- -	- -	+5,101	- -	- -	- -	+220
Total -	+3,603	+696	−46	+1,675	+1,109	+664	−2,030	+4,391	−5,163	+6,094	+931	+220
October - By rail - -	−10,724	−552	- -	- -	−1,021	−108	−5,124	−8,035	−4,921	+14,384	+9,463	—
„ sea - -	+18,699	- -	+307	+1,593	- -	- -	- -	+17,112	- -	- -	- -	+3,596
Total -	+7,975	−552	+307	+1,593	−1,021	−108	−5,124	+9,077	−4,921	+14,384	+9,463	+3,596
November - By rail - -	−12,840	−501	- -	- -	−1,412	+232	−2,432	+1,872	−7,951	+9,912	+1,961	—
„ sea - -	+39,684	- -	+333	+239	- -	- -	- -	+40,410	- -	- -	- -	+25,862
Total -	+26,844	−501	+333	+239	−1,412	+232	−2,432	+42,282	−7,951	+9,912	+1,961	+25,862
December - By rail - -	−30,638	+5,285	- -	- -	+1,405	+3,810	−1,337	+8,219	−12,281	+11,267	−1,014	—
„ sea - -	+56,135	- -	+1,712	+1,360	-	- -	- -	+64,227	- -	-	- -	+45,382
Total -	+25,497	+5,285	+1,712	+1,360	+1,405	+3,810	−1,337	+72,446	−12,281	+11,267	−1,014	+45,382
1877.												
January - By rail - -	−26,984	+4,462	- -	- -	+2,237	+3,986	−1,151	+7,837	−7,872	+11,993	+4,121	—
„ sea - -	+75,532	- -	+1,366	+2,694	- -	- -	- -	+88,447	- -	- -	- -	+94,954
Total -	+48,548	+4,462	+1,366	+2,694	+2,237	+3,986	−1,151	+96,284	−7,872	+11,993	+4,121	+94,954

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Movements of Food-grains by Sea and by the Madras Rail—(*continued*).

		NET RESULTS FOR											
		Places within the Madras Presidency.											
		Districts where there is no distress.							Distressed districts.				
		Ganjam.	Vizagapatam.	Godavery.	Tanjore.	South Canara.	Malabar.	Total.	South Arcot.	Kistna.	Nellore.	Cuddapah.	Bellary and Kurnool.
1		2	3	4	5	6	7	8	9	10	11	12	13
1877.		Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
February	By rail	- -	- -	- -	- -	- -	−9,540	−9,540	- -	- -	- -	+9,200	+12,023
	„ sea	−15,248	−1,835	−4,570	−1,677	−877	+21,625	−2,582	+2,613	+305	+5,587	—	—
	Total	−15,248	−1,835	−4,570	−1,677	−877	+12,085	−12,122	+2,613	+305	+5,587	+9,200	+12,023
March	By rail	- -	- -	- -	- -	- -	−7,297	−7,297	- -	- -	- -	+8,209	+14,208
	„ sea	−11,903	−1,746	−2,842	+352	−824	+27,844	+10,881	+6,099	−806	+3,531	—	—
	Total	−11,903	−1,746	−2,842	+352	−824	+20,547	+3,584	+6,099	−806	+3,531	+8,209	+14,208
April	By rail	- -	- -	- -	- -	- -	−10,531	−10,531	- -	- -	- -	+5,078	+16,657
	„ sea	−4,328	−544	−1,192	+10,787	−2,345	+34,327	+36,705	- -	+617	+8,549	—	—
	Total	−4,328	−544	−1,192	+10,787	−2,345	+23,796	+26,174	- -	+617	+8,549	+5,078	+16,657
Total	By rail	- -	- -	- -	- -	- -	−50,925	−50,925	- -	- -	- -	+47,9 96	+109,287
	„ sea	−47,610	−6,325	−77,404	−14,336	−15,518	+146,515	+14,678	+10,575	−13,871	+24,816	—	—
	Total	−47,610	−6,325	−77,404	−14,336	−15,518	+95,590	−36,247	+10,575	−13,871	+24,816	+47,996	+109,237

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Movements of Food-grains by Sea and by the Madras Rail—(*continued*).

		NET RESULTS FOR—(*continued*).											
		Places within the Madras Presidency—(*continued*).								Places beyond the Madras Presidency.			Grand Total.
		Distressed Districts—(*continued*).											
		Madras or Chingleput.	North Arcot.	Madura.	Tinnevelly.	Coimbatore.	Salem.	South Indian Railway.	Total.	Great Indian Peninsula Railway.	Mysore Territory.	Total.	
		14	15	16	17	18	19	20	21	22	23	24	25
1877.		Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
February	By rail	−19,970	+3,533	- -	- -	+3,338	+3,460	−481	+11,103	−10,665	+9,102	−1,563	—
	„ sea	+68,865	- -	+578	+3,065	- -	- -	- -	+80,913	- -	- -	—	+78,331
	Total	+48,895	+3,533	+578	+3,065	+3,338	+3,460	−481	+92,016	−10,665	+9,102	−1,563	+78,331
March	By rail	−34,671	+4,789	- -	- -	+3,221	+5,492	−1,209	+39	−8,226	+15,484	+7,258	—
	„ sea	+46,464	- -	+2,459	+8,374	- -	- -	- -	+66,121	- -	- -	- -	+77,002
	Total	+11,793	+4,789	+2,459	+8,374	+3,221	+5,492	−1,209	+66,160	−8,226	+15,484	+7,258	+77,002
April	By rail	−31,801	+2,733	- -	- -	+8,073	+5,238	−773	+5,205	−9,583	+14,909	+5,326	—
	„ sea	+39,488	- -	+5,327	+9,678	- -	- -	- -	+63,659	- -	- -	- -	+100,364
	Total	+7,687	+2,733	+5,327	+9,678	+8,073	+5,238	−773	+68,864	−9,583	+14,909	+5,326	+100,364
Total	By rail	−176,359	+19,437	- -	- -	+18,511	+22,877	−16,110	+25,589	−70,701	+96,037	+25,336	—
	„ sea	+368,508	- -	+11,920	+30,569	- -	- -	- -	+432,517	- -	- -	- -	+417,839
	Total	+192,149	+19,437	+11,920	+30,569	+18,511	+22,877	−16,110	+458,106	−70,701	+96,037	+25,336	+417,839

Madras, 1st June 1877.

(Signed) H. E. STOKES, Secretary.

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Movements of Food-grains by Sea and by the Madras Rail.

		RECEIVED AT										
		Places within the Madras Presidency.										
		Districts where there is no distress.							Distressed districts.			
		Ganjam.	Vizagapatam.	Godavery.	Tanjore.	South Canara.	Malabar.	Total.	Kistna.	Nellore.	Cuddapah.	Bellary and Kurnool.
1		2	3	4	5	6	7	8	9	10	11	12
		Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Ton
1876. August	By rail	- -	- -	- -	- -	- -	2,169	2,169	- -	- -	782	3,359
	„ sea	- -	879	- -	419	32	2,002	3,332	- -	61	—	—
	Total	- -	879	- -	419	32	4,171	5,501	- -	61	782	3,359
September	By rail	- -	- -	- -	- -	- -	615	615	- -	- -	762	5,040
	„ sea	16	1,267	4	1,797	114	4,967	8,165	- -	53	—	—
	Total	16	1,267	4	1,797	114	5,582	8,780	- -	53	762	5,040
October	By rail	- -	- -	- -	- -	- -	839	839	- -	- -	2,641	8,466
	„ sea	- -	210	- -	930	212	8,850	10,202	47	—	—	—
	Total	- -	210	- -	930	212	9,689	11,041	47	- -	2,641	8,466
November	By rail	- -	- -	- -	- -	- -	1,324	1,324	- -	- -	4,760	15,189
	„ sea	- -	- -	- -	516	309	11,722	12,547	272	—	—	—
	Total	- -	- -	- -	516	309	13,046	13,871	272	- -	4,760	15,189
December	By rail	- -	- -	- -	- -	- -	868	868	- -	- -	10,091	21,729
	„ sea	- -	4	- -	610	721	16,885	18,220	716	2,623	—	—
	Total	- -	4	- -	610	721	17,753	19,088	716	2,623	10,091	21,729
1877. January	By rail	- -	- -	- -	- -	- -	966	966	- -	- -	8,856	20,455
	„ sea	- -	59	61	477	1,537	35,153	37,287	473	5,899	—	—
	Total	- -	59	61	477	1,537	36,119	38,253	473	5,899	8,856	20,455

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Movements of Food-grains by Sea and by the Madras Rail—(*continued*).

		RECEIVED AT—(*continued*).										
		Places within the Madras Presidency—(*continued*).									Places beyond the Presidency.	Grand Total.
		Distressed districts—(*continued*).										
		Madras or Chingleput.	North Arcot.	South Arcot.	Madura.	Tinnevelly.	Coimbatore.	Salem.	South Indian Railway.	Total.	Mysore.	
		13	14	15	16	17	18	19	20	21	22	23
1876.		Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
August -	By rail -	429	653	- -	- -	- -	1,667	642	- -	7,532	3,049	12,750
	„ sea -	14,177	- -	590	95	1,901	- -	- -	- -	16,824	- -	20,156
	Total -	14,606	653	590	95	1,901	1,667	642	- -	24,356	3,049	32,906
September	By rail -	328	1,949	- -	- -	- -	1,238	1,264	- -	10,581	6,173	17,369
	„ sea -	9,987	- -	456	245	1,678	- -	- -	- -	12,419	- -	20,584
	Total -	10,315	1,949	456	245	1,678	1,238	1,264	- -	23,000	6,173	37,953
October	By rail -	234	1,863	- -	- -	- -	925	1,643	- -	15,772	14,485	31,096
	„ sea -	18,814	- -	621	441	1,617	- -	- -	- -	21,540	- -	31,742
	Total -	19,048	1,863	621	441	1,617	925	1,643	- -	37,312	14,485	62,838
November	By rail -	368	1,879	- -	- -	- -	1,962	2,183	- -	26,341	10,194	37,859
	„ sea -	39,684	- -	- -	357	410	- -	- -	- -	40,723	- -	53,270
	Total -	40,052	1,879	- -	357	410	1,962	2,183	- -	67,064	10,194	91,129
December	By rail -	107	6,775	- -	- -	- -	3,451	4,475	- -	46,628	11,515	59,011
	„ sea -	56,144	- -	1,858	1,903	1,361	- -	- -	- -	64,605	- -	82,825
	Total -	56,251	6,775	1,858	1,903	1,361	3,451	4,475	- -	111,233	11,515	141,836
1877.												
January	By rail -	201	5,034	- -	- -	- -	3,567	4,908	- -	43,021	12,072	56,059
	„ sea -	75,967	- -	2,536	1,642	2,765	- -	- -	- -	89,282	- -	126,569
	Total -	76,168	5,034	2,536	1,642	2,765	3,567	4,908	- -	132,303	12,072	182,628

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Movements of Food-grains by Sea and by the Madras Rail.

		RECEIVED AT									
		Places within the Madras Presidency.									
		Districts where there is no distress.							Distressed districts.			
		Ganjam.	Vizagapatam.	Godavery.	Tanjore.	South Canara.	Malabar.	Total.	Kistna.	Nellore.	Cuddapah.	Bellary and Kurnool.
1		2	3	4	5	6	7	8	9	10	11	12
1877.		Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
February	By rail	-	-	-	-	-	525	525	-	-	9,389	13,614
	„ sea	-	2	39	2,036	714	26,634	29,425	435	5,587	—	—
	Total	-	2	39	2,036	714	27,159	29,950	435	5,587	9,389	13,614
March	By rail	-	-	-	-	-	372	372	-	-	8,209	14,208
	„ sea	-	153	93	5,391	702	34,741	41,080	700	3,795	—	—
	Total	-	153	93	5,391	702	35,113	41,452	700	3,795	8,209	14,208
April	By rail	-	-	-	-	-	447	447	-	-	5,078	16,657
	„ sea	-	313	481	13,242	442	40,712	55,190	686	8,728	—	—
	Total	-	313	481	13,242	442	41,159	55,637	686	8,728	5,078	16,657
Total	By rail	-	-	-	-	-	8,125	8,125	-	-	50,568	118,717
	„ sea	16	2,887	678	25,418	4,783	181,666	215,448	3,329	26,746	—	—
	Total	16	2,887	678	25,418	4,783	189,791	223,573	3,329	26,746	50,568	118,717

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Movements of Food-grains by Sea and by the Madras Rail.

		RECEIVED AT—(*continued*).										
		Places within the Madras Presidency—(*continued*).									Places beyond the Presidency.	Grand Total.
		Distressed districts—(*continued*).										
		Madras or Chingleput.	North Arcot.	South Arcot.	Madura.	Tinnevelly.	Coimbatore.	Salem.	South Indian Railway.	Total.	Mysore.	
		13	14	15	16	17	18	19	20	21	22	23
1877.		Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
February	By rail	143	4,165	- -	- -	- -	3,826	4,037	- -	35,174	9,220	44,919
	„ sea	69,057	- -	2,687	634	3,093	- -	- -	- -	81,493	- -	110,918
	Total	69,200	4,165	2,687	634	3,093	3,826	4,037	- -	116,667	9,220	155,837
March	By rail	76	5,056	- -	- -	- -	3,612	5,786	- -	36,947	15,484	52,803
	„ sea	48,393	- -	6,149	3,016	8,400	- -	- -	- -	70,453	- -	111,533
	Total	48,469	5,056	6,149	3,016	8,400	3,612	5,786	- -	107,400	15,484	164,336
April	By rail	45	2,818	- -	- -	- -	8,479	5,382	201	38,660	14,909	54,016
	„ sea	41,779	- -	- -	6,359	9,694	- -	- -	- -	67,246	- -	122,436
	Total	41,824	2,818	- -	6,359	9,694	8,479	5,382	201	105,906	14,909	176,452
Total	By rail	1,931	30,192	- -	- -	- -	28,727	30,320	201	260,656	97,101	365,882
	„ sea	374,002	- -	14,897	14,692	30,919	- -	- -	- -	464,585	- -	680,033
	Total	375,933	30,192	14,897	14,692	30,919	28,727	30,320	201	725,241	97,101	1,045,915

Madras, 1st June 1877.

(Signed) H. E. STOKES, Secretary.

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Movements of Food-grains by Sea and by the Madras Rail.

		RECEIVED AT										
		Places within the Madras Presidency.										
		Districts where there is no distress.							Distressed districts.			
		Ganjam.	Vizagapatam.	Godavery.	Tanjore.	South Canara.	Malabar.	Total.	Kistna.	Nellore.	Cuddapah.	Bellary and Kurnool.
1		2	3	4	5	6	7	8	9	10	11	12
1877.		Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
February	By rail	-	-	-	-	-	525	525	-	-	9,389	13,614
	„ sea	-	2	39	2,036	714	26,634	29,425	435	5,587	—	—
	Total	-	2	39	2,036	714	27,159	29,950	435	5,587	9,389	13,614
March	By rail	-	-	-	-	-	372	372	-	-	8,209	14,208
	„ sea	-	153	93	5,391	702	34,741	41,080	700	3,795	—	—
	Total	-	153	93	5,391	702	35,113	41,452	700	3,795	8,209	14,208
April	By rail	-	-	-	-	-	447	447	-	-	5,078	16,657
	„ sea	-	313	481	13,242	442	40,712	55,190	686	8,728	—	—
	Total	-	313	481	13,242	442	41,159	55,637	686	8,728	5,078	16,657
Total	By rail	-	-	-	-	-	8,125	8,125	-	-	50,568	118,717
	„ sea	16	2,887	678	25,418	4,783	181,666	215,448	3,329	26,746	—	—
	Total	16	2,887	678	25,418	4,783	189,791	223,573	3,329	26,746	50,568	118,717

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Movements of Food-grains by Sea and by the Madras Rail.

		RECEIVED AT—(*continued*).										
		Places within the Madras Presidency—(*continued*).									Places beyond the Presidency.	Grand Total.
		Distressed districts—(*continued*).										
		Madras or Chingleput.	North Arcot.	South Arcot.	Madura.	Tinnevelly.	Coimbatore.	Salem.	South Indian Railway.	Total.	Mysore.	
		13	14	15	16	17	18	19	20	21	22	23
1877.		Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
February	By rail	143	4,165	- -	- -	- -	3,826	4,037	- -	35,174	9,220	44,919
	„ sea	69,057	- -	2,687	634	3,093	- -	- -	- -	81,493	- -	110,918
	Total	69,200	4,165	2,687	634	3,093	3,826	4,037	- -	116,667	9,220	155,837
March	By rail	76	5,056	- -	- -	- -	3,612	5,786	- -	36,947	15,484	52,803
	„ sea	48,393	- -	6,149	3,016	8,400	- -	- -	- -	70,453	- -	111,533
	Total	48,469	5,056	6,149	3,016	8,400	3,612	5,786	- -	107,400	15,484	164,336
April	By rail	45	2,818	- -	- -	- -	8,479	5,382	201	38,660	14,909	54,016
	„ sea	41,779	- -	- -	6,359	9,694	- -	- -	- -	67,246	- -	122,436
	Total	41,824	2,818	- -	6,359	9,694	8,479	5,382	201	105,906	14,909	176,452
Total	By rail	1,931	30,192	- -	- -	- -	28,727	30,320	201	260,656	97,101	365,882
	„ sea	374,002	- -	14,897	14,692	30,919	- -	- -	- -	464,585	- -	680,033
	Total	375,933	30,192	14,897	14,692	30,919	28,727	30,320	201	725,241	97,101	1,045,915

Madras, 1st June 1877.

(Signed) H. E. STOKES, Secretary.

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Movements of Food-grains by Sea and by the Madras Rail.

	FORWARDED FROM											
	Places within the Madras Presidency.											
	Districts where there is no distress.							Distressed districts.				
	Ganjam.	Vizagapatam.	Godavery.	Tanjore.	South Canara.	Malabar.	Total.	South Arcot.	Kistna.	Nellore.	Cuddapah.	Bellary and Kurnool.
1	2	3	4	5	6	7	8	9	10	11	12	13
1876.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	To
August - By rail - -	- -	- -	- -	- -	- -	1,081	1,081	- -	- -	- -	79	417
„ sea - -	1,293	61	8,744	7,547	16	70	17,731	1,383	7,296	1,196	—	—
Total - -	1,293	61	8,744	7,547	16	1,151	18,812	1,383	7,296	1,196	79	417
September - By rail - -	- -	- -	- -	- -	- -	836	836	- -	- -	- -	116	773
„ sea - -	996	112	5,846	5,601	280	211	13,046	1,302	5,112	288	—	—
Total - -	996	112	5,846	5,601	280	1,047	13,882	1,302	5,112	288	116	773
October - By rail - -	- -	- -	- -	- -	- -	2,267	2,267	- -	- -	- -	878	735
„ sea - -	172	497	13,861	6,818	798	1,572	23,718	1,513	2,642	—	—	—
Total - -	172	497	13,861	6,818	798	3,839	25,985	1,513	2,642	- -	878	735
November - By rail - -	- -	- -	- -	- -	- -	5,157	5,157	- -	- -	- -	550	574
„ sea - -	902	907	12,253	5,678	4,282	3,073	27,095	- -	118	—	—	—
Total - -	902	907	12,253	5,678	4,282	8,230	32,252	- -	118	- -	550	574
December - By rail - -	- -	- -	- -	- -	- -	8,073	8,073	- -	- -	- -	389	1,737
„ sea - -	6,512	1,643	17,112	1,660	5,691	4,447	37,065	- -	174	3	—	—
Total - -	6,512	1,643	17,112	1,660	5,691	12,520	45,138	- -	174	3	389	1,737
1877.												
January - By rail - -	- -	- -	- -	- -	- -	12,924	12,924	- -	- -	- -	371	3,653
„ sea - -	6,272	1,399	11,049	1,243	3,330	7,487	30,780	- -	53	—	—	—
Total - -	6,272	1,399	11,049	1,243	3,330	20,411	43,704	- -	53	- -	371	3,653

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Movements of Food-grains by Sea and by the Madras Rail—(*continued*).

	FORWARDED FROM—(*continued*).											
	Places within the Madras Presidency—(*continued*).								Places beyond the Presidency.			Grand Total.
	Distressed districts—(*continued*).											
	Madras or Chingleput.	North Arcot.	Madura.	Tinnevelly.	Coimbatore.	Salem.	South Indian Railway.	Total.	Great Indian Peninsula Railway.	Mysore.	Total.	
	14	15	16	17	18	19	20	21	22	23	24	25
1876.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
August - By rail	3,098	1,661	- -	- -	106	539	1,573	7,473	4,039	157	4,196	12,750
„ sea	201	- -	211	10	- -	- -	- -	10,297	- -	- -	- -	28,028
Total	3,299	1,661	211	10	106	539	1,573	17,770	4,039	157	4,196	40,778
September - By rail	6,390	1,253	- -	- -	129	600	2,030	11 291	5,163	79	5,242	17,369
„ sea	322	- -	291	3	- -	- -	- -	7,318	- -	- -	- -	20,364
Total	6,712	1,253	291	3	129	600	2,030	18,609	5,163	79	5,242	37,733
October - By rail	10,958	2,415	- -	- -	1,946	1,751	5,124	23,807	4,921	101	5,022	31,096
„ sea	115	- -	134	24	- -	- -	- -	4,428	- -	- -	- -	28,146
Total	11,073	2,415	134	24	1,946	1,751	5,124	28,235	4,921	101	5,022	59,242
November - By rail	13,208	2,380	- -	- -	3,374	1,951	2,432	24,469	7,951	282	8,233	37,859
„ sea	- -	- -	24	171	- -	- -	- -	313	- -	- -	- -	27,408
Total	13,208	2,380	24	171	3,374	1,951	2,432	24,782	7,951	282	8,233	65,267
December - By rail	30,745	1,490	- -	- -	2,046	665	1,337	38,409	12,281	248	12,529	59,011
„ sea	9	- -	191	1	- -	- -	- -	378	- -	- -	- -	37,443
Total	30,754	1,490	191	1	2,046	665	1,337	38,787	12,281	248	12,529	96,454
1877.												
January - By rail	27,185	572	- -	- -	1,330	922	1,151	35,184	7,872	79	7,951	56,059
„ sea	435	- -	276	71	- -	- -	- -	835	- -	- -	- -	31,615
Total	27,620	572	276	71	1,330	922	1,151	36,019	7,872	79	7,951	87,674

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Movements of Food-grains by Sea and by the Madras Rail.

		FORWARDED FROM											
		Places within the Madras Presidency.											
		Districts where there is no distress.							Distressed Districts.				
		Ganjam.	Vizagapatam.	Godavery.	Tanjore.	South Canara.	Malabar.	Total.	South Arcot.	Kistna.	Nellore.	Cuddapah.	Bellary and Kurnool.
1		2	3	4	5	6	7	8	9	10	11	12	13
1877.		Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
February	By rail	—	—	—	—	—	10,065	10,065	—	—	—	189	1,591
	„ sea	15,248	1,837	4,609	3,713	1,591	5,009	32,007	74	230	—	—	—
	Total	15,248	1,837	4,609	3,713	1,591	15,074	42,072	74	230	—	189	1,591
March	By rail	—	—	—	—	—	7,669	7,669	—	—	—	—	—
	„ sea	11,903	1,899	2,935	5,039	1,526	6,897	30,199	50	1,506	264	—	—
	Total	11,903	1,899	2,935	5,039	1,526	14,566	37,868	50	1,506	264	—	—
April	By rail	—	—	—	—	—	10,978	10,978	—	—	—	—	—
	„ sea	4,328	857	1,673	2,455	2,787	6,385	18,485	—	69	179	—	—
	Total	4,328	857	1,673	2,455	2,787	17,363	29,463	—	69	179	—	—
Total	By rail	—	—	—	—	—	59,050	59,050	—	—	—	2,572	9,480
	„ sea	47,626	9,212	78,082	39,754	20,301	35,151	230,126	4,322	17,200	1,930	—	—
	Total	47,626	9,212	78,082	39,754	20,301	94,201	289,176	4,322	17,200	1,930	2,572	9,480

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Movements of Food-grains by Sea and by the Madras Rail.

—		FORWARDED FROM—(*continued*).											
		Places within the Madras Presidency—(*continued*).								Place beyond the Presidency.			Grand Total.
		Distressed districts—(*continued*).											
		Madras or Chingleput.	North Arcot.	Madura.	Tinnevelly.	Coimbatore.	Salem.	South Indian Railway.	Total.	Great Indian Peninsula Railway.	Mysore.	Total.	
		14	15	16	17	18	19	20	21	22	23	24	25
		Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1877.													
February	By rail	20,113	632	- -	- -	488	577	481	24,071	10,665	118	10,783	44,919
	„ sea	192	- -	56	28	- -	- -	- -	580	- -	- -	- -	32,587
	Total	20,305	632	56	28	488	577	481	24,651	10,665	118	10,783	77,506
March	By rail	34,747	267	- -	- -	391	294	1,209	36,908	8,226	- -	8,226	52,803
	„ sea	1,929	- -	557	26	- -	- -	- -	4,332	- -	- -	- -	34,531
	Total	36,576	267	557	26	391	294	1,209	41,240	8,226	- -	8,226	87,334
April	By rail	31,846	85	- -	- -	406	144	974	33,455	9,583	- -	9,583	54,016
	„ sea	2,291	- -	1,032	16	- -	- -	- -	3,587	- -	- -	- -	22,072
	Total	34,137	85	1,032	16	406	144	974	37,042	9,583	- -	9,583	76,088
Total	By rail	178,290	10,755	- -	- -	10,216	7,443	16,311	235,067	70,701	1,064	71,765	365,882
	„ sea	5,494	- -	2,772	350	- -	- -	- -	32,068	- -	- -	- -	262,194
	Total	183,784	10,755	2,772	350	10,216	7,448	16,311	267,135	70,701	1,064	71,765	628,076

Madras, 1st June 1877.

(Signed) H. E. STOKES, Secretary.

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No. 31. Encl. in No. 103.

1877.

NUMBER of PEOPLE fed gratuitously by GOVERNMENT in the distressed districts of the MADRAS PRESIDENCY.

NAMES OF DISTRICTS.	JANUARY.				FEBRUARY.				MARCH.				
	Week ending				Week ending				Week ending				
	6th.	13th.	20th.	27th.	3rd.	10th.	17th.	24th.	3rd.	10th.	17th.	24th.	31st.
Kistna	201	168	722	334	455	41	430	191	160	184	397	235	530
Nellore	3,400	6,420	7,956	9,103	9,539	5,406	9,025	5,953	4,681	5,204	5,595	6,613	4,976
Cuddapah	885	1,003	1,419	893	1,623	1,723	1,723	1,705	1,634	1,256	2,600	3,268	6,129
Bellary	36,555	39,522	39,201	33,497	28,129	14,386	10,014	14,829	16,589	17,575	25,853	33,102	82,519
Kurnool	17,379	3,819	2,829	2,680	3,674	3,567	4,026	3,538	3,651	11,233	19,406	25,572	33,753
Chingleput { District	4,542	3,066	4,008	3,425	3,081	4,419	4,095	4,843	5,102	5,666	6,006	6,030	6,211
Chingleput { City Camps	19,714	21,196	22,740	20,059	20,599	20,447	19,934	18,500	20,732	21,238	21,816	23,135	24,224
North Arcot	-	-	-	-	-	324	619	557	835	1,398	1,712	2,089	2,060
Trichinopoly	—	—	—	—	—	—	—	—	—	—	—	—	—
Madura	841	185	589	331	296	557	197	230	188	328	537	1,263	1,484
Tinnevelly	-	5	283	359	92	71	93	138	192	272	260	417	415
Coimbatore	-	8	114	58	93	1,809	1,573	1,297	1,309	1,093	1,759	2,291	3,129
Salem	7,622	2,780	7,191	9,750	6,157	4,530	3,493	3,056	3,563	3,740	5,594	5,846	10,143
Total	91,189	78,172	87,052	80,489	73,738	57,280	55,222	54,837	58,636	69,187	91,535	109,861	175,573
South Arcot	-	-	-	-	-	-	-	-	156	-	47	59	93
Malabar	—	—	—	—	—	—	—	—	—	—	—	—	—
GRAND TOTAL	91,139	78,172	87,052	80,489	73,738	57,280	55,222	54,837	58,792	69,187	91,582	109,920	175,666
Average per month	84,213				60,269				101,029				

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Number of People fed gratuitously by Government in the distressed districts of the Madras Presidency—(*continued*).

Names of Districts.	April.				May.				June.				
	Week ending				Week ending				Week ending				
	7th.	14th.	21st.	28th.	5th.	12th.	19th.	26th.	2nd.	9th.	16th.	23rd.	30th.
Kistna - - -	442	2,298	4,141	509	364	382	259	179	382	383	356	480	1,145
Nellore - - -	22,267	38,447	58,235	13,151	18,431	21,797	18,217	18,873	20,322	16,978	27,225	28,901	27,980
Cuddapah - - -	14,397	30,409	29,013	24,988	24,810	28,726	27,434	26,321	33,629	36,314	45,955	51,469	56,362
Bellary - - -	66,551	80,366	95,074	101,623	108,499	120,917	132,394	136,110	139,886	155,044	154,583	157,066	148,366
Kurnool - - -	46,841	53,111	70,024	63,797	64,817	61,049	61,759	62,486	60,611	59,842	57,060	59,937	58,731
Chingleput { District -	6,473	18,215	51,996	9,059	10,441	13,477	11,540	16,751	19,662	18,621	27,770	43,565	35,256
Chingleput { City Camps -	25,805	27,425	27,77 6	28,997	30,025	32,972	33,122	33,214	30,576	26,855	24,444	23,600	22,756
North Arcot - - -	2,174	2,482	3,115	8,071	12,843	11,563	12,304	14,753	20,622	22,011	22,281	26,595	29,110
Trichinopoly - - -	- -	- -	- -	- -	- -	40	32	103	394	463	1,131	1,013	947
Madura - - -	11,056	27,595	5,871	6,224	7,776	8,286	8,905	9,106	11,448	13,941	11,247	14,293	15,976
Tinnevelly - - -	428	2,044	1,843	225	568	677	786	738	755	835	866	898	1,041
Coimbatore - - -	4,194	5,023	7,464	11,181	12,632	16,003	16,234	21,220	24,713	28,202	31,719	34,073	39,798
Salem - - -	16,836	25,021	34,364	35,540	60,420	44,146	56,026	58,237	74,238	78,878	74,949	83,321	94,418
Total - -	217,464	312,436	318,916	303,365	351,626	360,035	379,012	398,091	437,238	458,367	479,586	525,211	531,886
South Arcot - - -	1,256	2,368	5,689	1,280	1,991	2,844	3,443	4,108	4,530	6,198	8,296	8,239	10,606
Malabar - - -	- -	- -	- -	- -	- -	- -	- -	6	12	27	85	58	87
Grand Total - -	218,720	314,804	394,605	304,645	353,617	362,879	382,455	402,205	441,780	464,592	487,967	533,508	542,579
Average per month - -	308,198				375,289				494,085				

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Encl. in No. 37.

No. 32.

No. 313, dated Simla, 4th June 1877.

From SURGEON-MAJOR S. C. TOWNSEND, Officiating Sanitary Commissioner with the Government of India, to the ADDITIONAL SECRETARY TO THE GOVERNMENT OF INDIA, Department of Revenue, Agriculture, and Commerce.

I have the honour to forward, for the information of the Government, a copy of Dr. Lewis' Report on his preliminary investigations into the nature of the fever lately prevalent in Bombay.

Encl. in No. 60.

No. 33.

No. 1,054, dated Simla, 4th June 1877.

From R. B. CHAPMAN, ESQ., C.S.I., Secretary to the Government of India, Financial Department, to the CHIEF SECRETARY TO THE GOVERNMENT of BOMBAY.

In acknowledging the receipt of your letter No. 1,914, dated the 17th April, I am directed to say that the principle upon which the Resolution of the Government of India, No. 1,826, dated 28th March 1877, is based, was, as appears upon its face, adopted during the operations undertaken for the relief of the people of Bengal in the famine of 1873–74.

2. It seemed to the Governor-General in Council then, and seems still, that when a great calamity is confined to any particular Province, it is necessary and right that all provincial and local resources shall be exhausted in contending against it, before any demands are made upon the General Treasury of the Empire, and further that the Government of the Province is bound to take care that this principle is effectually applied, and to submit to every possible sacrifice in order to reduce to the utmost its ultimate demands upon the Imperial Revenues.

3. The extent to which provincial resources shall be held responsible for charges incurred on such occasions from the Imperial Treasury has yet to be determined; but the general principle that some such responsibility must be enforced has, as the Government of Bombay is aware, been recognised by the Secretary of State and by the Government of India.

4. The duty required from the Governments of Madras and Bombay by the Resolution against which the Government of Bombay now remonstrates was accepted, without controversy, by the Government of Bengal, and the accounts show that a sum of Rs. 12,70,476 was contributed from the provincial and local resources of Bengal towards the cost of the operations of 1873–74. The Government of Bombay will probably on reconsideration admit that, although these contributions doubtless pressed heavily upon provincial and local resources, the Government of India was right to require them, and the Government of Bengal right to make them; and that the rule should hereafter be always observed that Local Governments shall bear from provincial and local resources as large a share as possible of any expenditure incurred upon the operations for the relief of the people in time of famine.

5. The Government of India, on its part, while it would not think it right to relieve the provincial and local funds of other Provinces any more than it did those of Bengal, from any part of the burden which they can properly bear, or from the inconvenience and sacrifices thence resulting, will yet take care, as it did in the case of Bengal, that these funds are not left at the end of the operations insolvent. It must not, however, be assumed that because it was considered right, upon this principle, to assure to the Government of Bengal an unencumbered balance of Rs. 5,00,000 at the end of the famine of 1873–74, it will be necessary to leave as large a sum in the Provincial and Local Treasuries of the less populous and less extensive Presidencies.

6. In settling the accounts of the Government of India with that of Bengal, the Governor-General in Council did not appropriate any part of the balances belonging by law or equity to the District and Local Funds. The five lakhs of rupees left with the Government of Bengal was the aggregate amount placed at credit of that Government

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in its Provincial Treasury including the Local Funds which were by law and equity at the disposal of the Local Government at its discretion for provincial purposes. The balances of the District and other Appropriated Local Funds were not absorbed, but were left in the possession of the Committees apart from the settlement which left Rs. 5,00,000 at the disposal of the Provincial Government. These bodies were, however, required to contribute to the general need so far as the law allowed them, and so far as it was considered in each case just to demand contributions from them. Of the total sum of Rs. 12,70,746 contributed from Bengal provincial and local sources, Rs. 2,50,000 was thus paid by these separate District and other Local Committees.

7. The same course should be followed by the Government of Bombay in the present emergency. The Government of India cannot require and has not asked the Governments of Madras and Bombay to demand from any District, Municipal, or other Local Committee, any contribution towards the great expenditure for the relief of the present distress which is now proceeding, which the law does not authorise, or which, even though it might be legal, local circumstances may make inequitable. But it is, undoubtedly, the duty of the Local Governments to exact from every such local body the utmost contribution towards meeting the cost of relieving the local distress, which may legally and equitably be required from it.

8. The principle seems to the Government of India to be clearly right that the distress should first be met from local resources so far as is possible, and that district resources should only be responsible when local resources fail, provincial resources when district resources fail, and imperial resources last of all.

9. The Governor-General in Council trusts that the principle thus explained will now be accepted by the Government of Bombay as reasonable and right. His Excellency in Council will be prepared, on his part, to give liberal consideration to the representations which he will expect to receive hereafter as to the amount to be left at the credit of the Local Government and as to the contributions which should be exacted from the District and other Local Funds or resources.

Copy forwarded to the Department of Revenue, Agriculture, and Commerce for information.

No. 34.

Encl. in No. 37.

No. 504.—From the Additional Secretary to the Government of India to the Chief Commissioner in Mysore.

Simla, 8th June 1877.

His Excellency the Governor-General in Council has lately had under his consideration the condition of the Province of Mysore, with reference to the prevailing scarcity.

2. According to the latest accounts which have been received, the persons in receipt of relief appear to have been as under :—

Date—week ending.	Numbers on Works.		Numbers charitably relieved.	Total.
	Under Public Works agency.	Under Civil Officers.		
Christmas	48,644		21,959	70,603
February 17th, 1877	31,248	63,348		94,596
March 3rd, „	30,794	33,513	23,295	87,602
„ 10th, „	30,794	36,600	37,361	104,805
„ 17th, „	31,052	38,512	48,861	118,425
„ 24th, „	31,052	44,365	52,471	127,888
„ 31st, „	31,715	55,687	57,974	145,376
April 7th, „	31,715	32,047	59,444	123,206
„ 14th, „	30,542	29,159	68,641	128,342
„ 21st, „	30,542	27,686	82,501	140,729
„ 28th, „	33,183	30,070	87,693	150,946
May 5th, „	30,159	32,352	94,873	157,384
„ 12th, „	34,222	32,281	102,399	168,902
„ 19th, „	34,466	29,933	108,482	172,881

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3. According to the telegram of the 31st ultimo, the distribution of numbers was as under :—

	On works.	Charitably relieved.	Total.
Bangalore	4,630	56,996	61,626
Kolar	4,730	12,389	17,119
Túmkúr	5,529	16,247	21,776
Mysore	700	5,248	5,948
Hassan	1,761	4,701	6,462
Shimoga	1,234	936	2,170
Kadur	1,232	1,247	2,479
Chitaldroog	10,117	10,718	20,835
	29,933	108,482	138,415
On works under Public Works Department			34,466
Total			172,881

4. According to your letter No. 829—12 of April 21st, the allotments made up to April 17th, from the sum of 8 lakhs of rupees sanctioned for relief expenditure were as under :—

	Rs.	Rs.
Nundidroog Commissioner		49,216
Bangalore District—		
Cantonment	12,637	
Municipality	30,513	
Public Works Department	2,230	
District generally	1,28,766	
Ditto kitchens	74,000	
Cantonment and town kitchens	27,803	
Miscellaneous	2,489	
		2,79,438
Kolar District—		
Relief works	58,283	
Kitchens	27,156	
		85,439
Túmkúr District—		
Relief works	47,500	
Kitchens	38,300	
		85,800
Ashtagram Commissioner		16,000
Mysore District and Town		20,625
Hassan District		13,200
Nagar Commissioner		7,000
Shimoga District and Town		21,000
Kadur District		27,267
Chitaldroog District		33,000
Total		6,37,985

The actual expenditure against these allotments does not appear.

5. According to the weekly report for April 21st, the sanctioned and actual expenditure was as follows :—

	Sanctioned amounts. Rs.	Actual expenditure. Rs.
For works under Civil officers	10,51,547	7,25,272
Ditto Public Works Department	19,11,634	14,96,760
For charitable relief	1,77,792	1,59,688
Total	31,40,973	23,81,720

By May 5th these totals had risen to Rs. 33,51,033 and Rs. 29,52,596 respectively. It is, however presumed that these larger figures comprise the whole regular Public Works

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expenditure of the year, and possibly the District Fund and Municipal Fund charges too, much of which is not really for relief purposes.

6. The return for the week ending May 12th states the number of works in progress under revenue officers as 2,170. The number of persons employed on them being 32,281, the average on each work must be only about 15.

7. From the statistics above given, the following facts are apparent :—

1st.—That the numbers on works under professional agency have scarcely varied during the last two months and a half.

2nd.—That the numbers on works under revenue officers have on the whole varied little; they rose up to the end of March, then fell, for reasons which have formed the subject of separate correspondence; and now again are rising slowly, if at all.

3rd.—That the charitably relieved, who on March 17th were only as 49 to 69 on the works, were on May 19th as 108 to 64, thus preponderating greatly, whereas in Bombay and Madras their proportion to persons on works is only about one-third and one-half respectively.

4th.—That the relief afforded in the district of Bangalore enormously exceeds, both as to numbers and cost, that in other districts.

8. From these facts it might be inferred that relief works were regulated by the work in hand to be done, rather than by the number of persons requiring relief and able to do a full day's work; that no efficient supervision of such petty works could exist; that either multitudes are being improperly and unnecessarily fed, or relief works have been kept down to so narrow a limit that the people have been reduced to the last stage of distress, and have no alternative but to resort to the kitchens; or, again, that if village relief were efficient, such large bodies of persons would not leave their homes and crowd to centres of relief. In this connexion it may be noticed that in the weekly report of the 21st ultimo, the Commissioner of Ashtagram is said to state that "a large "portion of the persons fed at kitchens were half-starved and sickly emigrants from other "places."

9. His Excellency the Governor-General in Council is not, however, prepared to draw these conclusions, being well aware that the total numbers relieved is not excessive compared with the population, that emigration may have had an important effect upon the numbers able to work, and that habit, difficult to overcome, may promote resort to centres. At the same time his Excellency in Council considers that the apparently peculiar condition of affairs at the present juncture demands your most careful consideration, made by means of specially deputed officers, or otherwise as you may deem best, with the view of ensuring, on the one hand, that all who can work shall be forced to do so, and on the other, that charitable relief may reach all who are really in need of it without too great concentration of recipients, and its concomitant evils and abuses. His Excellency the Governor-General in Council has every confidence that you will take with vigour and promptitude whatever steps may seem to you advisable for these ends, and will be glad to know by telegraph the course you propose to adopt.

No. 35.

Encl. in No. 37.

No. 510.—From the Additional Secretary to the Government of India to the Secretary to the Government of Bombay, Public Works Department.

Simla, 8th June 1877.

With reference to your letter No. 492 C. W.—1,145 of the 6th instant, on the subject of the Ashteh Tank, I am directed to remark that in the programme appended to the resolution of the Bombay Government, No. 6,152 of October 27th, 1876, this work was entered as "Ashteh Tank, Mahrah, amount Rs. 3,64,000."

2. In the statement submitted with your letter No. 257 C. W.—986, dated December 8th, 1876, in reply to the request of the Government of India for full particulars, it is stated that the "amount of estimate" is Rs. 5,28,760.

3. In the memorandum forwarded with your letter No. 309—1,110 C. W. of December 23rd, in consequence of the telegram of the Government of India of December 12th, intimating that the statement above referred to did not give sufficient details, it is stated that the cost of the work will be Rs. 6,45,260, including all direct charges, and that the revenue will be 5·1 per cent. on this outlay.

4. From your letter No. 403 C. W.—921 of April 21st, 1877, it appears, however, that the direct outlay will be Rs. 6,77,618, and the total outlay including indirect charges Rs. 7,98,938, thus bringing the revenue down to 4·15 per cent.

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5. Your reply of the 16th instant to the inquiry what amount of *bonâ fide* relief labour the project affords is not very explicit, but as the number of relief labourers on the work has not yet reached 15,000, and the part of the work to cost Rs. 3,66,274 is said to be not quite all suitable for relief labour, it may be inferred that probably the *bonâ fide* relief labour will not cost above three lakhs, or one-third of the total.

6. I am directed to request the attention of his Excellency the Governor in Council to the foregoing remarks.

Encl. in No. 37.

No. 36.

No. 514.—From the Additional Secretary to the Government of India to the Secretary to the Government of Bombay, Public Works Department.

Simla, 11th June 1877.

I have the honour to inform you that his Excellency the Governor-General in Council has had under consideration the Resolutions of the Bombay Government regarding the Pangaon Tank, which are quoted in the margin.

No. 303 C. W.—225, dated January 30th, 1877.
No. 535 C. W.—1,220, dated May 24th, 1877.

2. The amount of the estimate is said to be Rs. 12,79,819, but whether this includes indirect charges or not, and what return is expected for the outlay, does not appear, the project not having yet been submitted as usual.

3. It is also not stated what arrangements have been effected with the Nizam for a fair apportionment of the cost with him, in consideration of the fact that five out of the 10 villages which it is proposed to irrigate are situated in his Highness's dominions.

4. The earthwork of the dam will, it appears, "afford employment to 20,000 relief labourers for as long as the famine is likely to last." As, however, the work was only recently commenced, and the numbers of labourers have not up to the latest known date exceeded those stated in the margin, while the near approach of the monsoon may render any large increase improbable, it would appear that the work is likely to afford but a small proportion of relief compared with the total outlay.

	No.
April 27th	1,278
May 4th	1,244
„ 11th	3,552
„ 18th	6,730
„ 25th	7,453

5. There may, of course, be circumstances which render the continuance of the work desirable, notwithstanding the apparent heavy future liability, but I am directed to invite the attention of his Excellency the Governor in Council to the subject in connexion with the foregoing remarks.

No. 37.

No. 26 of 1877.

From the Government of India, Department of Revenue, Agriculture, and Commerce, to the Secretary of State for India.

Simla, 11th June 1877.

No. 20. We enclose for your Lordship's information a copy of the reply of the Madras Government to the important Minutes of Sir Richard Temple regarding the utilisation of the Public Works Department, the removal of paupers from relief camps, and the exclusion of masonry and other work not purely relief work from the famine charges.

No. 26. We observe, however, from the Madras proceedings No. 1,830, dated May 28, of which a copy is appended, that the Madras Government have issued instructions in the sense of Sir Richard Temple's recommendations on the subject of the return of paupers to their homes.

2. The condition of the province of Mysore has for some time past occasioned us anxiety, on account of the large preponderance of the charitably relieved over those employed on the works, and the flocking of the former to the administrative centres, especially Bangalore. We are not prepared to affirm that these features necessarily indicate insufficient application of the labour test, or inadequate village relief, but we

No. 34. have thought it right to direct the attention of the Chief Commissioner to the subject, and to instruct him to make without delay any special inquiries into the state of affairs which he may deem to be requisite.

Nos. 35, 36. 3. We request your Lordship's attention to two letters which we have addressed to the Government of Bombay adverting to certain facts connected with the selection of the Ashti and Pangaon tanks as relief works. We consider it to be regretted that in the case of the former the full charge involved was not shown at the outset, and in the case

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of both, that works involving a less heavy ultimate outlay in order to render them serviceable were not selected for relief purposes.

4. The prospects of the season continue favourable. In Bombay two inches of rain have fallen at Carwar, and indications of the near approach of the monsoon are general. In Mysore heavy showers have fallen generally, and 1·15 inches have been registered at Bangalore. In Madras there has been rain in all districts except Chingleput. In Tinnevelly it has amounted to 2½ inches, and in Kistna, South Arcot, Tanjore, Trichinopoly, and Salem to about 1 inch, though not always generally. In the ceded districts and Kurnool only very slight showers have fallen, and the distress is proportionately severe. The numbers in receipt of relief were, by the latest returns, as follows :—

In Madras	- - -	790,304 on relief works. 430,727 charitably relieved.
In Bombay	- - -	387,075 on relief works. 143,737 charitably relieved.
In Mysore	- - -	56,631 on relief works. 107,814 charitably relieved.

5. We take this opportunity of enclosing a report by Dr. Lewis, Special Assistant to the Sanitary Commissioner with the Government of India, of his preliminary investigations into the nature of the fever lately prevalent in Bombay. "Opinions have been expressed," Dr. Lewis remarks, "that the fever is of an infectious character; that it was originally "produced by want; and that the disease presents the character usually ascribed to the "relapsing or famine fever of systematic writers." These conclusions have probably, he adds, been influenced by the discovery by Dr. Vandyke Carter of certain organisms in the blood of Bombay fever patients which are known as *spirilla*, and were discovered some nine years ago by Obermeier in the blood of relapsing fever patients. No. 25.

6. Although Dr. Lewis detected these *spirilla* in five out of 25 fever patients examined he saw no features in the fever itself sufficient to distinguish it from the ordinary "remittent" fevers of India, and he considers that similar comparisons should be made in Calcutta and elsewhere, and that his colleague Dr. D. D. Cunningham's inquiries in Madras should be collated before any satisfactory decision can be arrived at. As to the supposed infectious character of the fever found in Bombay, and any direct causative relation between the fever and the famine, Dr. Lewis failed to find any satisfactory evidence, but he hopes to be hereafter in a position to submit a more detailed account of the technical features of the inquiry, especially as regards the import of the presence of *spirilla* in the blood.

We have, &c.
(Signed) LYTTON.
F. P. HAINES.
ALEX. J. ARBUTHNOT.
E. C. BAYLEY.
A. CLARKE.
J. STRACHEY.
E. B. JOHNSON.
WHITLEY STOKES.

No. 38.

Encl. in No. 60.

No. 42 P., dated Bombay Castle, 11th June 1877.

From MAJOR-GENERAL M. K. KENNEDY, R.E., Secretary to Government of Bombay, P. W. Department, to the ADDITIONAL SECRETARY TO THE GOVERNMENT OF INDIA.

I am directed to bring to the notice of the Government of India that this Government have been furnished by the Government of Madras with a copy of their Despatch to the Secretary of State for India, No. 38 of the 26th May last, and, among other accompanying papers, with a copy of a Resolution by the Government of Madras, in the Revenue Department, No. 1,788 of the 22nd May, and I am to submit, for the information of the Government of India, one or two observations on these documents, so far as they refer to the arrangements for famine relief that have been made in Bombay.

2. In speaking of the lower scale of wage, *i. e.*, the scale which provides that an adult male shall receive the value of 1 lb. of grain in addition to half an anna in money, women and children in proportion—commonly called the Civil Agency scale—the Madras

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Government remark that they have "seen reason to believe that the scale is practically "of very limited operation in Bombay, and there only with a specially light task." As regards this observation, I am to state that, speaking of the present time and of the progress of the famine operations in Bombay since January last, the Government of Madras are correct in respect to the limited number of persons who are on the lower scale of wages.

3. In the earlier stages of the distress, and before the Government of Bombay were able to undertake large works, the number of relief labourers on the Civil Agency works was very considerable, amounting to nearly a half of the whole. As soon, however, as works under the better discipline and more strict management of the Public Works Department were organised, the numbers on the lower scale under the Civil officers were reduced, and they now stand, and for some time past have stood, at about one-tenth of the whole number employed.

4. The cause which has conduced to the limited application of the lower scale noticed by the Government of Madras has been, that the Government of Bombay have been enabled in the great majority of cases to grant the higher scale of the value of 1 lb. of grain, plus 1 anna in money, per man, in payment for a commensurate return of good and useful work.

5. Most of the persons who have been employed on the lower scale are old and partially incapable persons, who have not been found fit to perform the higher task exacted on the works under the Public Works Department, but the task that has been demanded from the less capable persons can hardly be called "specially light," and it is the same task that the Government of Madras have now ruled should be exacted from the persons to whom that Government have applied the higher scale of wages. The Government of Madras rule that the work to be performed on the higher rate of pay shall be limited to 50 per cent. of a full task according to individual's physical capacity and other collateral circumstances; and this is precisely the task that has been laid down to accompany the lower scale of wages in Bombay, the task for the higher scale being 75 per cent. of a full task.

6. Orders regarding the special relief of nursing mothers, and of children under 7 years of age, have been in force in Bombay from a very early period of the famine operations.

7. Piece-work at ordinary rates has been disallowed in Bombay on the principle that, although the Government have determined to sustain the people in a manner that will secure, as far as possible, a commensurate return for the outlay incurred, and that will not demoralise the recipients of relief, yet they do not propose to expend a larger sum of the public money than is absolutely needed to secure the essential object aimed at; and they hold that, if the extent of relief necessary to secure the substantial safety of the people be afforded, any excess on the outlay needed for that purpose is not justifiable, even though it be ultimately represented by work which, though it may prove useful, would not have been undertaken in ordinary times and under normal conditions. If this view be correct as regards large and useful works undertaken for relief purposes, but carried out under strict discipline and by professional agency, it is, perhaps, especially so as regards the petty works usually performed in return for the lower rate of wages under Civil officers, and for the most part in and near villages.

No. 39.

Telegram from Viceroy to the Secretary of State for India, 12th June 1877.

Yesterday's Despatch covered reply of the Madras Government to Sir Richard Temple's suggestions regarding utilisation of Public Works agency, the reduction of relief camps, and the exclusion from famine charges of masonry and other not purely relief work; they have apparently not adopted the first suggestion, but have issued instructions in the sense of the others.

Mysore occasions anxiety on account of large proportion of charitably relieved. We have invited Chief Commissioner's attention to conditions of province, and authorised special inquiries. We have also sent report by Dr. Lewis on nature of fever recently prevalent in Bombay. He reserves final opinion, but has not found satisfactory evidence that fever is infectious or caused by famine, or different from ordinary remittent fever.

Prospects of season continue favourable in Bombay, two inches of rain at Carwar, and general indications of near approach of monsoon. In Mysore heavy showers general.

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In Madras rain in all districts except Chingleput, but very slight in ceded districts and Kurnool.

Numbers relieved were, in Madras, 730,000 on works, 430,000 charitably relieved. In Mysore, 57,000 on works, 108,000 charitably relieved. In Bombay, 387,000 on works, 144,000 charitably relieved.

No. 40.

Encl. in No. 60.

No. 1,963, dated Fort St. George, 12th June 1877.

From the Additional Secretary to the Government of Madras to the Secretary to the Government of India.

For some weeks there has been a gradual and continuous rise in prices in the districts of this Presidency generally. This rise has left the prices which are now generally stationary at the dates marginally shown in terms of seers of 80 tolas to the rupee.

Districts.	Rice.		Cholum.		Raggi.		Cumboo.	
	Week ending 5th June.	Price in May last year.	Week ending 5th June.	Price in May last year.	Week ending 5th June.	Price in May last year.	Week ending 5th June.	Price in May last year.
Gaujam	13·	20·2	19·	23·9	21·	36·3	26·	..
Vizagapatam	11·	16·7	17·	28·4	19·	30·2	21·	..
Godavery	10·	20·9	16·	33·1	17·	38·0	20·	..
Kistna	8·45	19·8	11·15	30·3	12·94	35·2	10·38	..
Nellore	7·78	15·1	9·64	27·8	11·74	29·8	10·03	..
Madras	8·78	11·7	11·90	18·0	10·64	19·3	..	..
Chingleput	8·90	15·9	9·05	..	10·72	22·6	..	..
South Arcot	8·75	15·4	11·	24·4	11·5	23·9	11·75	..
Trichinopoly	7·6	14·4	13·2	34·1	10·3	26·3	9·7	..
Tanjore	8·	14·7	10·	27·3	12·18	25·8	10·81	..
Madura	8·2	14·7	10·4	35·1	9·8	30·8	9·7	..
Tinnevelly	8·25	12·3	11·25	24·4	10·75	25·5	11·	..
Kurnool	6·95	15·3	8·06	28·3	9·51	28·1	8·92	..
Cuddapah	7·73	14·1	8·66	26·2	9·25	27·6	8·92	..
Bellary	6·83	14·8	7·56	25·3	8·25	25·4	7·29	..
North Arcot	7·9	14·5	8·9	23·0	9·8	23·1	8·2	..
Salem	7·43	13·2	9·	21·7	8·81	23·5	8·12	..
Coimbatore	7·40	12·7	8·41	20·3	8·89	23·6	8·61	..
Nilgiris	7·4	10·4	8·45	14·2	9·	16·6	9·	..
South Canara	9·73	12·5	..	..	11·84	17·7	..	..
Malabar	9·09	12·5	..	..	12·25	19·5	..	..

The Collector's reports, however, show that while in April all markets were supplied with either raggi, cholum, or cumboo, as well as rice, at the end of May, in Tanjore, no cholum or cumboo was obtainable in four markets out of nine, and no cholum or cumboo in two others, while rice was 7·5 seers to the rupee in three markets. In Trichinopoly, out of five markets no grain, except rice, was obtainable at Kulitalai, and rice was 6·5 seers in Udyapolium. In Coimbatore rice was 4·9 seers the rupee in Collegal taluk, and raggi 6·9, while prices were high generally in Pallachi taluk. In Salem prices at Tripatore were, rice 6·42 seers the rupee, raggi 8·12, and cumboo 7·44, while in Salem itself rice was 7·68. In Bellary, though prices are stationary in Kudlighi and Hurpenhully, rice is 5·25 seers the rupee, and 5·5 in Hudgully, while cholum is 6 to 6½ seers the rupee. In South Arcot, of eight markets cholum was not quoted in four, nor cumboo in two. In Chingleput, of six markets cholum and cumboo were not quoted each in five markets. In South Canara cholum and cumboo are not quoted, but are not consumed. In Tinnevelly cholum and cumboo were not quoted in four and three markets out of five. In Malabar cholum and cumboo are not quoted; in Madura cholum is not quoted at all in one out of six markets. In Kistna, out of four markets cumboo is not quoted in two. On the Nilgiris, of four markets, cholum is not quoted in one, cumboo in two. In the Godavery, of six markets cumboo is not quoted in four. While in Kurnool the price at Ramalcotta was quoted for rice at 6·0, while cholum was 7·1, and no other grain was quoted.

It thus appears that throughout the greater portion of this Presidency prices are at a point which causes a most severe pressure and continually increasing distress.

There are doubtless yet considerable stocks in the Presidency, although it is found impossible to obtain certain and reliable information, and these a favourable south-west monsoon may cause to be brought forward; but that these stocks must have been seriously diminished is apparent from the fact that while the consumption of the population at 1 lb. per head per diem would equal about 3,849,300 tons, the total import of food-grain to the Presidency, from August to April has been only 417,839, as shown by the annexed statement prepared by the Board of Revenue. The increasing demand on the stock at Bellary for Mysore territory is also noticeable, the export of grain from Bellary being as shown below:—

	To Mysore.	To Hyderabad.	Total.
From 3rd to 31st March	285·8	911·6	1197·2
During April	660·0	1604·2	2264·2
Up to 26th May	822·1	1649·9	2472·0

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The stock available at the ports for inland transport was ascertained at the end of last month to be:—

		Tons.
Madras - - - -	25,000	35,000
On sea - - - -	10,000	
Negapatam - - - -	-	8,000
Beypore station, and some in boats -	-	1,500
Total -	-	44,500
Say -	-	45,000

This stock will be entirely moved up-country, in the usual course of traffic, by the end of the current month, and Government are not aware of any considerable further quantity being on its way or ordered; and there is no accumulation at the up-country railway stations. While it is very probable that the price grain has now reached may induce increased importations, yet the Governor in Council deems it his duty to point out that, while he is under no apprehension as to the means of the railways to carry the daily supplies, yet, if the railway power is not made use of with regularity, there will be very serious ground for apprehension, because the number of trains that can be run is limited by the circumstances of the line, and the locomotive power and waggon stock available. If any material diminution of the grain traffic inland occurs for a fortnight, it will probably be found in practice impossible to carry up the quantity which will be thus deficient in addition to the ordinary daily demands.

For these reasons I am directed to state that the present state of trade causes this Government much anxiety, the pressure of the existing high prices is rapidly adding to the numbers whose sole dependence must be State aid, not only in those districts which have been noticed as distressed, but even in others; and it is moreover reducing to abject poverty very many of those who should and would have maintained themselves throughout, had prices similar to those which generally prevailed in the famine districts of Bengal in 1874 prevailed in this Presidency.

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Movements of Food-grains by Sea and by the Madras Rail.

	Net results for																							
	Places within the Madras Presidency.																				Places beyond the Madras Presidency.			Grand Total.
	Districts where there is no Distress.							Distressed Districts.																
	Ganjam.	Vizagapatam.	Godavery.	Tanjore.	South Canara.	Malabar.	Total.	South Arcot.	Kistna.	Nellore.	Cuddapah.	Bellary and Kurnool.	Madras or Chingleput.	North Arcot.	Madura.	Tinnevelly.	Coimbatore.	Salem.	South Indian Railway.	Total.	Great Indian Peninsula Railway.	Mysore Territory.	Total.	
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
August 1876 - By rail	..	..	..	..	..	+1,088	+1,088	..	..	..	+703	+2,942	−2,669	−1,008	..	..	+1,561	+103	−1,573	+59	−4,039	+2,892	−1,147	..
August 1876 - By sea	−1,293	+818	−8,744	−7,128	+16	+1,932	−14,399	−793	−7,296	−1,135	..	..	+13,976	..	−116	+1,891	..	..	..	+6,527	..	..	..	−7,872
Total - - -	−1,293	+818	−8,744	−7,128	+16	+3,020	−13,311	−793	−7,296	−1,135	+703	+2,942	+11,307	−1,008	−116	+1,891	+1,561	+103	−1,573	+6,586	−4,039	+2,892	−1,147	−7,872
September 1876 - By rail	..	..	..	..	..	−221	−221	..	..	..	+646	+4,267	−6,062	+696	..	..	+1,109	+664	−2,030	−710	−5,163	+6,094	+931	..
September 1876 - By sea	−980	+1,155	−5,842	−3,804	−166	+4,756	−4,881	−846	−5,112	−235	..	..	+9,665	..	−46	+1,675	..	..	..	+5,101	..	..	..	+220
Total - - -	−980	+1,155	−5,842	−3,804	−166	+4,535	−5,102	−846	−5,112	−235	+646	+4,267	+3,603	+696	−46	+1,675	+1,109	+664	−2,030	+4,391	−5,163	+6,094	+931	+220
October 1876 - By rail	..	..	..	..	..	−1,428	−1,428	..	..	..	+1,763	+7,731	−10,724	−552	..	..	−1,021	−108	−5,124	−8,035	−4,921	+14,384	+9,463	..
October 1876 - By sea	−172	−287	−13,861	−5,888	−586	+7,278	−13,516	−892	−2,595	..	..	..	+18,699	..	+307	+1,593	..	..	..	+17,112	..	..	..	+3,596
Total - - -	−172	−287	−13,861	−5,888	−586	+5,850	−14,944	−892	−2,595	..	+1,763	+7,731	+7,975	−552	+307	+1,593	−1,021	−108	−5,124	+9,077	−4,921	+14,384	+9,463	+3,596
November 1876 - By rail	..	..	..	..	..	−3,833	−3,833	..	..	..	+4,210	+14,615	−12,840	−501	..	..	−1,412	+232	−2,432	+1,872	−7,951	+9,912	+1,961	..
November 1876 - By sea	−902	−907	−12,253	−5,162	−3,973	+8,649	−14,548	..	+154	..	..	..	+39,684	..	+333	+239	..	..	..	+40,410	..	..	..	+25,862
Total - - -	−902	−907	−12,253	−5,162	−3,973	+4,816	−18,381	..	+154	..	+4,210	+14,615	+26,844	−501	+333	+239	−1,412	+232	−2,432	+42,282	−7,951	+9,912	+1,961	+25,862
December 1876 - By rail	..	..	..	..	..	−7,205	−7,205	..	..	..	+9,702	+19,992	−30,638	+5,285	..	..	+1,405	+3,810	−1,337	+8,219	−12,281	+11,267	−1,014	..
December 1876 - By sea	−6,512	−1,639	−17,112	−1,050	−4,970	+12,438	−18,845	+1,858	+542	+2,620	..	..	+56,135	..	+1,712	+1,360	..	..	..	+64,227	..	..	..	+45,382
Total - - -	−6,512	−1,639	−17,112	−1,050	−4,970	+5,233	−26,050	+1,858	+542	+2,620	+9,702	+19,992	+25,497	+5,285	+1,712	+1,360	+1,405	+3,810	−1,337	+72,446	−12,281	+11,267	−1,014	+45,382
January 1877 - By rail	..	..	..	..	..	−11,958	−11,958	..	..	..	+8,485	+16,802	−26,934	+4,462	..	..	+2,237	+3,986	−1,151	+7,837	−7,872	+11,993	+4,121	..
January 1877 - By sea	−6,272	−1,340	−10,988	−766	−1,793	+27,666	+6,507	+2,536	+420	+5,899	..	..	+75,532	..	+1,366	+2,694	..	..	..	+88,447	..	..	..	+94,954
Total - - -	−6,272	−1,340	−10,988	−766	−1,793	+15,708	−5,451	+2,536	+420	+5,899	+8,485	+16,802	+48,598	+4,462	+1,366	+2,694	+2,237	+3,986	−1,151	+96,284	−7,872	+11,993	+4,121	+94,954
February 1877 - By rail	..	..	..	..	..	−9,540	−9,540	..	..	..	+9,200	+12,023	−19,970	+3,533	..	..	+3,338	+3,460	−481	+11,103	−10,665	+9,102	−1,563	..
February 1877 - By sea	−15,248	−1,835	−4,570	−1,677	−877	+21,625	−2,582	+2,613	+205	+5,587	..	..	+68,865	..	+578	+3,065	..	..	..	+80,913	..	..	..	+78,331
Total - - -	−15,248	−1,835	−4,570	−1,677	−877	+12,085	−12,122	+2,613	+205	+5,587	+9,200	+12,023	+48,895	+3,533	+578	+3,065	+3,338	+3,460	−481	+92,016	−10,665	+9,102	−1,563	+78,331
March 1877 - By rail	..	..	..	..	..	−7,297	−7,297	..	..	..	+8,209	+14,208	−34,671	+4,789	..	..	+3,221	+5,492	−1,209	+39	−8,226	+15,484	+7,258	..
March 1877 - By sea	−11,903	−1,746	−2,842	+352	−824	+27,844	+10,881	+6,099	−806	+3,531	..	..	+46,464	..	+2,459	+8,374	..	..	..	+66,120	..	..	..	+77,002
Total - - -	−11,903	−1,746	−2,842	+352	−824	+20,547	+3,584	+6,099	−806	+3,531	+8,209	+14,208	+11,793	+4,789	+2,459	+8,374	+3,221	+5,492	−1,209	+66,160	−8,226	+15,484	+7,258	+77,002
April 1877 - By rail	..	..	..	..	..	−10,531	−10,531	..	..	+...	+5,078	+16,657	−31,801	+2,733	..	..	+8,073	+5,238	−773	+5,205	−9,583	+14,909	+5,326	..
April 1877 - By sea	−4,328	−544	−1,192	+10,787	−2,345	+34,327	+36,705	..	+617	8,549	..	..	+39,488	..	+5,327	+9,678	..	..	..	+65,659	..	..	..	+100,364
Total - - -	−4,328	−544	−1,192	+10,787	−23,45	+23,796	+26,174	..	+617	+8,549	+5,078	+16,657	+7,687	+2,733	+5,327	+9,678	+8,073	+5,238	−773	+68,864	−9,583	+14,909	+5,326	+100,364
Total - By rail	..	..	..	..	..	−50,925	−50,925	..	..	..	+47,996	+109,237	−176,359	+19,437	..	..	+18,511	+22,877	−16,110	+25,589	−70,701	+96,037	+25,336	..
Total - By sea	−47,610	−6,325	−77,404	−14,336	−15,518	+146,515	−14,678	+10,575	−13,871	+24,816	..	..	+368,508	..	+11,920	+30,569	..	..	..	+432,517	..	..	..	+417,839
Total -	−47,610	−6,325	−77,404	−14,336	−15,518	+95,590	−65,603	+10,575	−13,871	+24,816	+47,996	+109,237	+192,149	+19,437	+11,920	+30,569	+18,511	+22,877	−16,110	+458,106	−70,701	+96,037	+25,336	+417,839

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Encl. in No. 60.

No. 41.

EXTRACT from the PROCEEDINGS of the GOVERNMENT OF INDIA, Financial Department, No. 1,169, dated Simla, the 14th June 1877.

RESOLUTION.—The Governor-General in Council is pleased to decide that all outlay on public works executed for the purpose of relieving distress among the people arising from famine, whether supervised by the officers of the Public Works Department, or by Civil officers, shall, in the first instance, be recorded in the accounts of the Public Works Department under a suspense head to be called "Famine Relief."

2. Of the whole outlay thus recorded, the portion which represents the value of the work done calculated at normal rates must be ultimately recorded as expenditure under the proper sub-divisions of the Service head Public Works, ordinary or extraordinary, as the case may be, the remainder being transferred to the Service head "Famine Relief."

3. The responsibility of determining, in each case, how much of such outlay shall be recorded as Public Works expenditure, and how much as expenditure under the head of Famine Relief, will rest upon the Public Works Department. But it is important that the Suspense Account to be kept in the Public Works Department should be cleared as quickly as possible, and no such refinements of calculations should be attempted or permitted as will cause any delay in the attainment of this object.

4. The Governor-General in Council trusts to the Local Governments to issue such subsidiary orders as will secure this result.

5. As a rule, the Governor-General in Council considers that experience shows, conclusively, that public works executed for relief purposes can be most conveniently and economically supervised by the professional officers of the Public Works Department; but if, in any case, this is found impracticable and the supervision of such works is entrusted to Civil officers, the arrangement must not be allowed to interfere with thorough obedience to the present order, and the Civil officers must act only as disbursers of the Public Works Department, submitting to that Department all accounts of their outlay.

6. This Resolution is to be applied immediately, and with retrospective effect, to the outlay now being incurred for the relief of the distress arising from the present famine in the Presidencies of Madras and Bombay.

ORDERED.—That this Resolution be communicated to the Revenue and Public Works Departments of the Government of India, to the Local Governments, to the Comptroller-General, and to the Accountants-General, and Deputy Accountants-General in independent charge.

No. 42.

TELEGRAM from the GOVERNOR OF BOMBAY to the SECRETARY OF STATE FOR INDIA, 15th June 1877.

Weekly report sent yesterday.

Rain has fallen in all distressed districts, also in Bombay, but monsoon has not properly commenced.

Situation slightly improved, and agriculture progressing. No marked change. Prices still high.

No. 43.

TELEGRAM from the GOVERNOR OF MADRAS to the SECRETARY OF STATE FOR INDIA, 16th June 1877.

Monsoon rains have commenced.

Hugry River stopped Bellary Railway, Monday. Bridge, permanent, will be ready Sunday.

Prices generally steady.

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No. 44.

Encl. in No. 60.

Dated Calcutta, 18th June 1877.

From SURGEON D. D. CUNNINGHAM, Special Assistant to the Sanitary Commissioner with the Government of India, to SURGEON-MAJOR S. C. TOWNSEND, Officiating Sanitary Commissioner with the Government of India.

I have the honour to report that, in accordance with your instructions, I proceeded to Madras in order to ascertain whether any peculiar form of fever were present among the inmates of the relief camps there, and to investigate the pathology of the so-called "famine diarrhœa" and "famine dysentery." I arrived in Madras on the 20th of May and left on the 8th June, reaching Calcutta on the 13th of the month.

2. In regard to the occurrence of any peculiar forms of fever, careful inquiries were made as to the presence, then or at any previous period during the prevalence of the famine, of any forms of fever which could in any way be ascribed to the influence of want. I could hear of no such disease as having occurred previously, and during the whole period of my stay in Madras fevers of any kind were practically non-existent, hardly a case being present in any of the hospitals or relief camps in spite of the high degree of mortality prevalent at that time among the inmates of the latter.

3. I had, however, ample opportunity of investigating the pathology of the diarrhœa and dysentery so prevalent and fatal in the camps. Careful *post-mortem* examinations were made of the bodies of persons dying in the Monegar Choultry relief camp where the mortality was very high, and almost entirely due to diarrhœa and dysentery. Numerous specimens of the various tissues and organs of such cases have been preserved, and will form the subject of minute microscopic investigation. As this, however, will necessarily be the work of some time, I shall in the meantime give a brief account of such of the results arrived at in the examinations conducted in Madras as appear to be of most practical importance.

4. The general results of such examinations were confirmatory of the belief that morbid conditions exist which may with propriety be termed "famine diarrhœa" or "famine dysentery," as the case may be. There are, without doubt, cases in which the symptons of disease observed during life can be referred to no other origin save morbid changes and degenerations dependent on mal-nutrition. Many other cases occurring among the inmates of the relief camps are, however, complicated by the supervention of other diseases, such as acute dysentery, pneumonia, &c., and although in the majority of such cases the conditions leading to true "famine diarrhœa" may be distinctly detected, and in some the complications may be directly ascribed to their agency, yet the fatal termination is caused, or at all events accelerated by the complications.

5. The pathological changes essentially characteristic of "famine diarrhœa and dysentery" consist in a softening and subsequent atrophy of the mucous membrane of the intestinal canal, due apparently to a process of fatty degeneration of the tissues, and leading to the destruction of the apparatus provided for the absorption of nutritive material. That such a process is sufficient to account for the phenomena of the disease observed during life, is manifest. The disintegration of the intestinal mucous membrane fully accounts for the disordered state of the alimentary functions. The pathological appearances also account for the failure of curative measures, improved diet, medicines, &c., in the treatment of the disease. Where once the complex structures of the intestinal mucous membrane have been so seriously affected by degenerative changes dependent on insufficient nourishment, they cannot be renewed, and no diet, however careful and generous it be, can be of any avail when once the means, by which alone it can be appropriated to the necessities of the body, have been destroyed.

6. In conclusion, I must acknowledge the great obligation which I am under to the medical officers in Madras who assisted me in obtaining opportunities for investigation, and facilitated my work in other ways—more especially must I acknowledge the aid which was afforded to me by Mr. Cornish, the Sanitary Commissioner for Madras.

No. 45.

Encl. in No. 79.

No. 2,030, dated Fort St. George, 18th June 1877.

From the ADDITIONAL SECRETARY TO THE GOVERNMENT OF MADRAS, Revenue Department, to the ADDITIONAL SECRETARY TO THE GOVERNMENT OF INDIA.

In reply to your letter No. 441, dated 12th May 1877, I am directed to state that his Grace the Governor of Madras in Council is fully alive to the importance of inducing

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the inmates of relief camps to return as speedily as may be to their own homes, as well with regard to economy in the administration of relief as to lessen the evils attendant upon large gatherings of comparatively unemployed people.

2. With this view many had been sent home before the date of Sir Richard Temple's note of the 22nd April, but the results were not encouraging. It was found in practice that there was not sufficient inducement to these people to remain at their homes either on the relief wage or village relief. Thus many such persons after being cared for and strengthened by food and removed by train to Vellore in the North Arcot district, almost immediately set out to wander back to Madras, where, after a time, they were again found in the streets exhausted and famine-stricken.

3. This Government consider that no extensive enforced removals from relief camps can be successfully carried out until, in the ordinary operations of agriculture, are found sufficient inducements to overcome those which draw the people into the large towns.

4. Hitherto movements of the people under direct pressure, whether it be in large parties or in small, whether to the large relief works or from relief camps under escort of camp servants, have proved barren of results for good, as the people largely desert on the road.

5. Considerable numbers have, however, been induced voluntarily to return to their villages.

6. I am further directed to state that his Grace the Governor in Council is giving, and will continue to give, that attention to the subject noticed by Sir Richard Temple which its importance demands.

No. 46.

Telegram, dated 19th June 1877.

From the Viceroy to the Secretary of State for India.

In Madras, rain has fallen in all districts in fair quantities; on works 848,000, charitably relieved 461,000; prices generally high, and grain imports limited.

In Mysore, heavy showers throughout the Province; one inch at Bangalore; four inches in Coorg; prospects encouraging; on works 58,000, charitably relieved 109,000.

In Bombay, one to three inches in Nassik, Poona, Ahmednagar, and Sholapur, three-quarters inch in Sattara, six inches in Canara; numbers on works 375,000, charitably relieved 157,000, of whom children 114,000. Heavy rain has just begun at Bombay.

Temple telegraphs, young crops Dharwar, Belgaum thriving; large areas preparing Kaladgi, Satara, Nassik, Khandesh, and sowing begun, prices of grain unaltered. Imports coast reduced, on railway considerably increased, general situation hopeful, marked improvements shortly expected, cattle benefit by new grass.

Encl. in No. 79.

No. 47.

Extract from the Proceedings of the Government of Bombay in the Public Works Department, No. 98 P., dated 20th June 1877.

Resolution.—As soon as the monsoon shall have been favourably established, it is necessary for the agricultural prospects of the season, and for the relief of the existing demands on the treasury for outlay on account of State charity, that many of the persons who are now supported at the public expense should resume their usual avocations, and revert to their ordinary modes of obtaining a livelihood. The preliminary eastern showers have been very heavy and general, the regular western rain has now commenced, and there is a prospect that the season will be a very favourable one as far as rain-fall is concerned; but this inestimable advantage will be lost, if those on whose labour the tillage and cultivation of the land depend should cling, in large numbers, to the charity of the State, instead of making efforts to help themselves, and to resume their independent occupations. Many are now voluntarily leaving the relief works, and more, it may confidently be expected, will do so shortly. But if any who ought to return to their own avocations should try to remain on State relief, some pressure may be needed for them, and must be applied gently, and prudently, but firmly.

2. In order to effect this, the following measures should be adopted in each district,

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and in every case wherever and as soon as the rain-fall has been good and favourable :—

1st.—The gangs on each work should be carefully inspected by the Civil officers of the district, the registers should be examined, and all the holders or sub-holders of land, who may be in good physical condition, should be relegated to their villages, and be told that they should now betake themselves, as in ordinary years, to the cultivation of their fields.

2nd.—The class of agricultural labourers should be similarly examined, and sent to their villages to assist the landholders as in ordinary years; for unless labour be available, or if it be detained on the relief works, the landholders will be placed in difficulties, and their field operations will be materially impeded.

3rd.—To these people, and to those who may seek to remain on the works, it should be explained, that at this season of the year Government can neither carry on the works in progress, nor open fresh ones, and that it is not for the good of the people that Government shall endeavour to do so; that this has been a season of difficulty due to drought, during which the Government have consented to aid people who would otherwise have been unable to find subsistence, but that this drought has happily passed away, and that the people can, and must now, exert themselves in their own behalf, and that the remaining works will therefore be very shortly entirely closed.

4th.—That Government will not give any general Tagai advances, but will only afford assistance in special cases, and on good security; and that for such credit as they may need, and as they would ordinarily require, the people must look to the sources from which they usually obtain it.

5th.—That it will shortly be necessary, as the people who are not ordinary labourers leave the works, and as the latter, or such of them as it may be necessary or practicable to keep open, gradually assume the character of ordinary Public Works, to raise the tasks to the usual standard, and to cease to pay wages, should tasks not be performed, in consequence of idleness, interruption by rain, or from any other cause.

3. The Civil and Public Works Department officers in each district should co-operate fully, and should work together in carrying out these arrangements; but all the necessary measures as above detailed should, as regards the time and extent of their application, be left to be finally determined by the Collectors and their assistants. These officers should bear in mind that, though the general policy to be adopted is indicated above, and is to be generally adopted, it need not and should not be applied abruptly or mechanically, but should be introduced with judgment and discrimination, as well as with firmness on a careful consideration of the prospects of the season in each district as regards agriculture and of the condition of the people.

No. 48.

Encl. in No. 79.

Dated Bombay, the 21st June 1877.

DEMI-OFFICIAL from Dr. J. B. LYON, to General KENNEDY.

Thinking the enclosed may interest you, I have cut it out of the "Bombay Gazette," of the 19th where it appeared.

The corresponding value in grains of nitrogen 12·5 grammes is 193 grains and of carbon 263 grammes=4,060 grains; this for men weighing 140 lbs. is about my scale, No. 3 (bare sustenance). As the experience detailed in the letter cut from the "Bombay Gazette," shows that men can do a considerable amount of work on a diet of the value quoted above, the indication is that my scales are on the side of liberality rather than in the other way.

No. 49.

TELEGRAM from the GOVERNOR OF BOMBAY to the SECRETARY OF STATE FOR INDIA, 22nd June 1877.

Monsoon begun well on Bombay coast and throughout Deccan. Effect not fully produced on relief operations. Prices still high, but numbers on relief works decreasing, and agriculture progressing.

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No. 50.

No. 538. From the ADDITIONAL SECRETARY TO THE GOVERNMENT OF INDIA to the ADDITIONAL SECRETARY TO THE GOVERNMENT OF MADRAS.

Simla, 25th June 1877.

I am directed to transmit, for the consideration of his Grace the Governor of Madras in Council, the enclosed copies of a Minute by Sir Richard Temple, under date the 9th ultimo, and of two memoranda by his late Secretary, Mr. C. Bernard, on the subject of remissions of land revenue.

2. The Governor-General in Council thinks that this question should receive very careful attention when the pressure of the present famine shall have passed away; and will be glad to be furnished with a full statement of the conclusions at which the Madras Government may arrive after considering the arguments and observations contained in the enclosed papers.

No. 51.

No. 27 of 1877.

From the GOVERNMENT OF INDIA, Department of Revenue, Agriculture, and Commerce, to the SECRETARY OF STATE FOR INDIA.

Simla, the 25th June 1877.

Your Lordship has been furnished by the Madras Government, in their Despatches of the 14th and 28th April last, with the correspondence which has taken place between that Government and the Government of India on the subject of supplying Sir Richard Temple with copies of certain papers for which he applied relating to the subject of granting remissions of the land revenue on the occasion of failure of the crops. We now enclose a complete collection of the correspondence which has taken place on this subject, including a Minute by Sir Richard Temple, under date the 9th ultimo, and two memoranda by his late Secretary, Mr. Bernard. We have caused copies of these papers to be furnished to the Government of Madras, with a request that they will give them their careful consideration, and furnish us hereafter with a full statement of the conclusions at which they may arrive. A copy of the letter which we have addressed to the Madras Government on the subject is enclosed.

Nos. 2 to 7, 9 to 12, 14 to 19, 22 to 24, 27, 50.

2. It will be in the recollection of your Lordship that the suggestion made by Sir Richard Temple at an early period of his tour that, instead of entirely remitting the revenue due to Government on land on which the crops had failed, its collection should be only suspended pending inquiries as to the circumstances of the persons concerned was referred to in our Despatches of the 26th January and the 9th and 16th of February last, in the last of which Despatches we stated that we had intimated to the Governments of Madras and Bombay that the matter would be left to their discretion, adding that, in our opinion, the Madras Government had shown good reasons for the opinion which they strongly held, that in *ryotwari* districts it would, as a general rule, be inexpedient to substitute suspensions for remissions of revenue, especially in the case of a season so disastrous as the present. The course taken by us in this matter received the approval of your Lordship in your Despatch of the 29th March last, paragraph 6.

3. In forwarding to the Government of Madras Sir Richard Temple's telegram of the 18th March, requesting that he might be furnished with the papers above alluded to, we were actuated by the consideration that, however inexpedient it might be, during the pressure of a serious famine, to interfere with the discretion of a Local Government on a subject specially demanding a knowledge of local circumstances, it would not be right or proper that an officer engaged upon the arduous duty which had been entrusted to Sir Richard Temple, should be denied access to official records which he desired to consult on a matter to which he attached importance, and which was closely connected with the work upon which he was engaged. It was subsequently explained to the Madras Government in the Viceroy's telegram to the Duke of Buckingham, dated the 9th April, that there was no intention of interfering with the discretion of the Local Government regarding remissions on the present occasion; but that a full discussion of the subject might be useful for future famines; that the discussion could be treated as confidential if the Madras Government desired, but that it seemed due to Sir Richard Temple that his request should be complied with. The Madras Government having declined to comply with our request, and having persisted in their refusal after the receipt of the Viceroy's telegram just referred to, we deemed it necessary to issue the order conveyed in our

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telegram of the 20th April, which led to Sir Richard Temple's being furnished with the papers for which he had applied.

4. We have not deemed it expedient for the present, in our correspondence with the Government of Madras, to take any notice of their letter dated the 10th April last, stating their reasons for declining to comply with the request made in our telegram of the 21st March; but we think it right to call your Lordship's attention to the tone and tenor of that letter, which appear to us to indicate a very extraordinary misapprehension on the part of the present Government of Madras of their position in relation to the Government of India. We shall probably recur to this subject when the time comes for reviewing the incidents of the present famine.

We have, &c.
(Signed) LYTTON.
F. P. HAINES.
E. C. BAYLEY.
ALEX. J. ARBUTHNOT.
A. CLARKE.
J. STRACHEY.
E. B. JOHNSON.
WHITLEY STOKES.

No. 52. Encl. in No. 60.

No. 348, dated Simla, 25th June 1877.

From SURGEON-MAJOR S. C. TOWNSEND, Officiating Sanitary Commissioner with the Government of India, to the Hon. T. C. HOPE, C.S.I., Additional Secretary to the Government of India.

I have the honour to submit, for the information of the Government, a copy of Dr. D. D. Cunningham's report on his preliminary investigations into the nature of the diarrhœa and dysentry lately prevalent in Madras.

No. 53. Encl. in No. 103.

No. 2,875, dated 25th June 1877.

From the CHIEF SECRETARY, TO THE GOVERNMENT OF BOMBAY, to the SECRETARY TO THE GOVERNMENT of INDIA, Financial Department.

I am directed to acknowledge the receipt of your letter, No. 1,054, dated 4th instant, on the subject of the appropriation of Provincial and Local Funds for famine expenditure, and in reply to state that his Excellency the Governor in Council will gladly accept the principle therein explained, and is assured that the Viceroy in Council will give liberal consideration to the representations which will be made hereafter on this subject.

No. 54.

Telegram, dated 26th June 1877.

From VICEROY to the SECRETARY OF STATE FOR INDIA.

Yesterday's Despatch covers complete collection of correspondence about question of remission or suspension of land revenue on failure of crops, includes Minute by Temple and two memoranda by Bernard; these papers have been also sent for consideration and opinion of Madras Government, without intention of limiting discretion in present case already given, but for final settlement of question in view of future famines. Madras Government having in April last refused to furnish Temple with necessary information on this subject, we were obliged to order it to be given to him.

Prospects of season generally very encouraging in Madras. Rainfall in Bellary, Kurnool, and Cuddapah from 1 to 6 inches; in Kistna, Nellore, North Arcot, Chingleput, varied up to 2 inches; South Arcot, up to 1 inch; Coimbatore, Salem, ½ inch; everywhere slight; in Mysore, up to 1 inch, but more needed in Coorg; 3½ inches in Bombay. Temple telegraphs thus: "Monsoon burst favourably 19th, 20th, along entire western "border of famine tract, gradually extending eastward; growing crops much benefited; "agriculture being everywhere resumed; prices of grain slightly higher; fall shortly

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"expected; imports coast small. Railway returns not received, believed large. Situa-
"tion improved. Good monsoon following heavy eastern rain promises favourable
"season. People encouraged; numbers expected to leave works soon. Cattle saved."
Message ends.

Numbers relieved in Madras, 857,000 on works, 483,000 charitably; in Mysore, 57,000 on works, 115,000 charitably; in Bombay, 366,000 on works, 165,000 charitably.

Encl. in No. 60.

No. 55.

Telegram, dated 27th June 1877.

From Revenue Additional Secretary, Madras, to Revenue Additional Secretary,

Prices still continue high notwithstanding the rain; rice risen in Vizagapatam, Kurnool, Bellary, Chingleput, and South Arcot. Dry grains risen in Vizagapatam, Godavery, Kistna, Kurnool, Bellary, North Arcot, Chingleput, South Arcot, Salem, Madura, Tinnevelly, and Malabar. Stocks entirely exhausted in Nilgiris district and in some taluks of Salem and Bellary. Increased prices at Kurnool reported, attributable to decrease of stocks and difficulty of carriage.

No. 56.

Telegram, dated 29th June 1877.

From Governor of Bombay to the Secretary of State for India.

Weekly famine report favourable. Continued rain in all distressed districts except Kaladgi. Agriculture progressing everywhere except one part of Poona district. Numbers on relief works decreasing. Prices high. No sickness. Monsoon not yet begun in Guzerat.

Encl. in No. 60.

No. 57.

No. 557.—From the Additional Secretary to the Government of India to the Additional Secretary to the Government of Madras.

Simla, 29th June 1877.

I am directed to acknowledge the receipt of your letter No. 1,963 of the 12th instant, and your telegram of the 27th instant, on the subject of the rise of prices of food-grains, the low condition of stocks, and the consequent increasing pressure upon the population of the distressed districts of the Madras Presidency.

2. The prices given in your letter are contrasted in the following table with those of March 31st as given in the Proceedings of the Board of Revenue dated April 6th, which were published in the Supplement to the "Gazette of India" of the 21st idem:—

Districts.	Rice.		Cholum.		Ragi.		Cumboo.	
	June 5.	Mar. 31.	June 5.	Mar. 31.	June 5.	Mar. 31.	June 5.	Mar. 31.
Kistna	8·45	8·26	11·15	10·97	12·94	13·9	10·38	10·53
Nellore	7·78	7·87	9·64	10·	11·74	11·88	10·06	9·8
Chingleput	8·90	9·40	9·05	10·98	10·72	11·26	..	10·78
South Arcot	8·75	..	11·	..	11·5	..	11·75	..
Trichinopoly	7·6	8·12	13·2	16·8	10·3	10·87	9·7	10·32
Tanjore	8·	..	10·	..	12·18	..	10·81	..
Madura	8·2	8·47	10·4	12·15	9·8	10·46	9·7	11·08
Tinnevelly	8·25	8·40	11·25	9·	10·75	11·47	11·	10·85
Kurnool	6·95	7·29	8·06	8·79	9·51	9·92	8·92	8·88
Cuddapah	7·73	7·91	8·66	9·53	9·25	9·91	8·92	8·36
Bellary	6·83	7·41	7·56	9·05	8·25	9·30	7·29	8·64
North Arcot	7·9	8·58	8·9	10·58	9·8	10·38	8·2	8·91
Salem	7·43	7·70	9·	9·09	8·81	9·26	8·12	8·93
Coimbatore	7·40	7·62	8·41	9·14	8·89	9·55	8·61	10·61

From this it would seem that in Kistna, Nellore, Salem, and Tinnevelly prices were on June 5th pretty much the same as they were at the end of March; that in North Arcot, Trichinopoly, and Madura there has been a considerable rise, but only in comparison

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with a previous lower average; that in Chingleput, Kurnool, and Cuddapah the rise has been about half a seer, and in Bellary and Coimbatore about a seer. For South Arcot and Tanjore the prices of March are not available.

3. Since June 5th the general upward tendency of prices has continued, but the table in the margin, which has been compiled from the telegraphic reports of prices on the 19th instant, which appeared in the "Gazette of India" on the 23rd instant, shows that except in Bellary a man can still everywhere procure for 1 anna more than the 1 lb. ration, which in Bombay at least has been found sufficient for maintaining health; that except in Bellary and North Arcot 1 anna and 3 pies suffice to procure within about 2 ounces of what authorities in Madras have admitted to be sufficient, while in seven districts that sum will procure more than 1½ lbs. Under the new scale lately introduced the conditions as regards the labourers on the relief works are still more favourable.

—	Lbs. per rupee.		For 1 anna.	For 1-3.	For 1-6.
	Rice.	Dry grain.			
			lbs. oz.	lbs. oz.	lbs. oz.
Kistna -	17·84	23·95	1 7·95	1 13·93	2 3·92
Nellore -	15·90	21·98	1 5·98	1 11·47	2 0·97
Cuddapah -	14·75	17·98	1 1·98	1 6·47	1 10·97
Kurnool -	14·31	17·94	1 1·94	1 6·42	1 10·91
Bellary -	13·82	14·93	0 14·93	1 2·66	1 6·39
North Arcot	15·24	16·89	1 0·89	1 5·11	1 9·33
Chingleput -	17·42	19·69	1 3·69	1 8·61	1 13·53
South Arcot	16·99	22·88	1 6·88	1 12·60	2 2·32
Salem -	14·79	17·55	1 1·55	1 5·94	1 10·32
Coimbatore -	15·14	17·42	1 1·42	1 5·77	1 10·13
Madura -	17·09	21·36	1 5·36	1 10·70	2 0·04
Tinnevelly -	16·48	22·66	1 6·66	1 12·32	2 1·99
Malabar -	18·17	24·20	1 8·20	1 14·25	2 4·30

4. With reference to the supply of food grains, I am to remark that although the marginal statement, taken from the returns published weekly in the "Gazette of India," shows a certain falling off in the imports into the Madras Presidency by sea, the last three weeks have witnessed a very decided improvement in the shipments of rice from both Calcutta and Burmah.

—	By sea.	From Raichore.
	Tons.	Tons.
Gazette of April 7th -	17,768	2,050
" " 14th -	22,956	1,550
" " 21st -	17,634	1,760
" " 28th -	18,526	1,570
" May 5th -	15,666	3,100
" " 12th -	16,583	3,115
" " 19th -	16,295	2,378
" " 26th -	14,441	1,728
" June 2nd -	12,372	1,883
" " 9th -	14,663	3,672
" " 16th -	10,570	2,178
" " 23rd -	8,133	2,378

5. Under these circumstances his Excellency the Governor-General in Council is of opinion that the rise of prices which has occurred is not excessive, and considers it, on the whole, a fortunate circumstance that the rates are keeping up for the present, and thus holding out fair inducements for the continued importation of food by private trade. It is indeed not improbable that this rise may lead to some increase in the numbers on the works and in receipt of gratuitous relief, and so may augment the drain on the public Treasury, but this his Excellency in Council believes to be a far lesser evil than that which would result from any reversion to the plan of purchasing supplies of grain on behalf of Government—a plan likely to be more costly and less efficient than that of leaving the present high prices to attract importation. This general principle is, of course, subject to the modification which was referred to in paragraph 9 of the instructions to Sir R. Temple of the 16th January last, in the case of remote localities where private trade may be inactive. In such cases the best course would appear to be for the Government to advertise for supplies to be delivered at the nearest spots to which there are facilities for importation, and to give the relief to those who need it in the shape of food. It is obviously most desirable that the measure here referred to should be adopted only on the most clear and urgent grounds, and that if resorted to, it should be carried out with the utmost practicable publicity.

6. In conclusion, I am to state that with the view of informing the trade of the present condition of supplies, and the continuance of the policy of non-interference hitherto observed, this correspondence will be made public with the least practicable delay.

No. 58.

Encl. in No. 79.

Dated Calcutta, 29th June 1877.

From the Secretary, Bengal Chamber of Commerce, to the Officiating Secretary to the Government of India.

The Committee of the Chamber of Commerce have observed in to-day's papers, with considerable concern and interest, the essential portions of a reported correspondence

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between the Supreme Government and the Government of Madras relative to the famine districts of that Presidency, the prices of food-grains, and supplies necessary to maintain adequate stocks for the requirements of the people dependent on Government aid.

But there are some points which do not appear to have been touched upon, and the Committee bring them to notice in the hope that Government will furnish such information as may place private trade in a position to judge how far it may proceed in helping the State in its measures of relief; and with the view that merchants may have full confidence in operating to that purpose it is submitted that the details of stock and of consumption at the various inland markets in the famine districts should be given with all possible publicity both in Calcutta and Madras.

Another material point, in the judgment of the Committee, is that a careful inquiry regarding the probable out-turn of growing crops of food-grains will enable the Government to arrive at an approximate estimate of the extent to which existing stocks should be supplemented by importations from Bengal, Burmah, &c., and it would be expedient to fix, if possible, after such inquiry, a date at which it may be reasonably assumed that such importations might cease.

It appears to the Committee of the Chamber that unless some authoritative declaration in these respects be promptly made, the course of trade may be arrested by merchants discontinuing their shipments, and that the existing scarcity will be aggravated by diminished supplies from this and other rice ports.

No. 59.

Telegram, dated 2nd July 1877.

From Viceroy to the Secretary of State for India.

To-day's Despatch covers important correspondence with Madras Government, which we have made public. That Government lately reported that a gradual and continuous rise of prices in the famine districts generally was causing a most severe pressure, and increasing the distress; also a serious diminution of stocks, and their exhaustion in Nilgiris, and parts of Salem, Bellary, and Cuddapah. They added that the whole of the stocks at the seaports would be moved inland by the end of the current month. As there were no accumulations at up-country stations, and no considerable fresh imports were known to be expected, they urged the importance of using railways with regularity, and pointed out the impossibility of making up afterwards for even a fortnight's diminished traffic. We replied that, comparing the prices on June 5th with those for 21st March, no very serious increase was perceptible. Even at the prices of the 19th instant, more than 1 lb. of grain was procurable for 1 anna everywhere except at Bellary, and under the new scale, more was procurable everywhere by relief labourers than was sufficient to support health according to the highest estimates. By returns published in "Gazette of India" importations by sea were certainly falling off somewhat, but then the shipments from Bengal and Burmah had increased during the last three weeks, and the Raichore supply was well maintained. We hold that the rise of prices which has occurred is not excessive, and that it is, on the whole, fortunate that the rates are keeping up, for thereby a fair inducement is offered for the continued importation of food by private trade. It is not improbable that the rise may cause some increase in the numbers on the relief works, and of those receiving gratuitous relief, and may so augment the drain of the public Treasury. But we believe this to be a far lesser evil than would result from reversion to the plan of purchasing supplies of grain by Government,—a plan likely to be more costly and less efficient than that of leaving the present high prices to attract importation. This principle was, of course, liable to the modification referred to in paragraph 9 of Sir Richard Temple's instructions of the 16th January last, in the case of remote localities where private trade is inactive. In such cases the best course appeared to be for the Government to advertise for supplies, to be delivered at the nearest spots where there are facilities for importation, and to give relief to those who need it, in the shape of cooked food; but the measure there referred to should be adopted only on the most clear and urgent grounds, and if resorted to, should be carried out with the utmost practicable publicity. Despatch also states that question of carrying powers on railways still engages attention in Revenue and Works Departments. Engines hired by Great Indian Peninsula from Baroda Railway; shelter provided for grain accumulated at numerous stations; Wardha Valley Railway kept open. Despatch forwards letter from Bombay, explaining that paucity of relief labourers on lower scale, to which Madras referred in Despatch, Number 38, is owing to works orga-

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nisation obtaining higher tasks. Letter from Doctor Cunningham also sent, regarding the alleged presence of famine, diarrhœa, and dysentery at Madras. Prospects of season generally favourable; fair general rain in all Bombay distressed districts, except Kaladgi; in Mysore, showers, but more required. In Madras, light rain in most districts, but deficient monsoon in Kurnool and Cuddapah apprehended. Numbers relieved are, in Madras, 836,000 on works, 507,000 charitably. In Mysore, 57,000 on works, 111,000 charitably. In Bombay, 325,000 on works, 173,000 charitably. Temple telegraphs that monsoon has not yet reached Kaladgi, favourable elsewhere; prices slightly rising, fall expected when grass springs up and sowing completed; imports, coast small, by rail steady; general position still improving; condition of people good; cattle improving; causes of anxiety passing away.

No. 60.

No. 28. of 1877.

From the Government of India, Department of Revenue, Agriculture, and Commerce, to the Secretary of State for India.

Simla, 2nd July 1877.

We enclose for your Lordship's information copies of an important correspondence which has taken place with the Madras Government on the subject of the rise of prices of food-grains, the reduction of stocks, and the consequent pressure upon the population of the distressed districts of the Madras Presidency. The Madras Government represented that there had been a gradual and continuous rise of prices in the districts generally, and that stocks had been seriously diminished in most parts, and were entirely exhausted in the Nilgiris and some portions of Salem, Bellary, and Cuddapah. They also stated that stocks at the ports would have been moved inland by the end of the month, that there were no accumulations at up-country stations, and that no considerable fresh imports by sea were known to be on their way. Finally, they dwelt on the importance of the resources of the railways being used with regularity, and the impossibility of making up at a later date for a material diminution, even of a fortnight's duration, in the grain traffic inland. Nos. 40, 55, 57.

2. These representations have received our most anxious consideration. Comparing the prices of June 5th with those of March 31st, however, we find them in four districts to be pretty much the same as then, and in eight more not to have practically increased above one seer per rupee. Up to the 19th instant the upward tendency is still apparent, but even on that date a man could still procure for 1 anna everywhere, except in Bellary, more than the 1 lb. ration which has been found in Bombay to be sufficient for the maintenance of health under moderate labour, while in seven districts that sum would procure more than the 1½ lbs. pound ration which is admitted to be adequate by the Madras authorities. Labourers on the relief works would, under the new scale recently adopted, be able to get considerably more. A comparison of prices in Madras with those prevailing in Bombay and Mysore moreover was, in the most distressed districts, in favour of the former.

3. With regard to the supply of food-grains from beyond the Madras Presidency, it appeared that though there had been of late a certain falling off in the actual imports by sea, the shipments from Calcutta and Burma had improved during the last three weeks, and that the importations viâ Raichore were well maintained.

4. Under these circumstances we considered it justifiable to conclude that the rise of prices which had taken place was not excessive, and was on the whole not to be regretted in view of the inducements thereby held out for the continuance and increase of importation by means of private trade. And we were of opinion that the increase which might occur in the numbers relieved by means of the works and charitably, was a lesser evil than that which would be created by any return to the policy of undertaking the supply of grain through Government agency. The only exception to this policy of non-interference was, as it always has been, the case of remote localities which private trade was unable to reach, to which allusion was made in paragraph 9 of the instructions to Sir Richard Temple of January 16th. While reminding the Madras Government of this exception, we have pointed out that such a measure as the supply by Government of the localities indicated should not be resorted to except on the most clear and urgent grounds, and should be carried out by means of advertisement for supplies to be delivered at the nearest points to which there are facilities for importation, and with the fullest practicable publicity. We have made our decision public by means of the press and the "Gazette of India."

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5. In connexion with the reduction of stocks and large demand for food-grains in the Madras Presidency, the question of the carrying powers of the various railways has engaged our attention in the Departments both of Revenue and Public Works. For the Great Indian Peninsula Railway 40 engines were some time ago ordered, of which 10 have arrived and will shortly be in use; others have also been procured from the Bombay, Baroda, and Central India Railway, which is enabled by the commencement of the monsoon to dispense with them. The additions necessary to the stock of the East Indian and the Sind, Punjab, and Delhi Railways are under consideration. In the meantime, representations from the Chief Commissioner of the Central Provinces as to the large accumulations of grain at Nagpore, Katni, and various other places have resulted in the provision of temporary shelter at numerous stations. Arrangements have also been made, on the representation and under the guarantee of the local traders, to keep the Wurdah Valley State Railway open during the monsoon, in order to remove the large quantity of grain now lying and expected to arrive at Hingunghat. Upon the whole, while it is to be regretted that trade should have received any check, and prices in the distressed districts should have been raised through the limited powers of the railways, there can be no doubt, on the one hand, that all existing resources have been fully utilised, and on the other, that trade will have received an important stimulus and a direction into new channels through which it may be expected hereafter to flow.

6. We do not propose, for the present, to offer any further remarks upon the increase lately made by the Government of Madras to the wages of labourers on relief works, as we have not yet satisfied ourselves regarding the extent to which the measure has altered the wages at the time actually in force, or the grounds upon which it was deemed to be necessary. We enclose, however, for your Lordship's information, a copy of a
No. 38. letter from the Government of Bombay, on the subject of the allusion made by the Government of Madras in their Despatch to your Lordship, No. 38, dated the 26th of May, to the scale in force in the former Presidency. The remarks in this letter regarding piece-work have our full concurrence, and have been lately communicated to the Chief Commissioner of Mysore with reference to the adoption of piece-work in that Province.

No. 44. 7. In continuation of paragraphs 5 and 6 of our Despatch No. 26, dated the 11th ultimo, we enclose copy of a report from Dr. D. D. Cunningham, the Special Asistant to the Sanitary Commissioner with the Government of India, regarding his preliminary investigations at Madras into the nature of the so-called "famine diarrhœa" and "famine dysentery" lately prevalent there. While unable to discover any forms of fever which could in any way be ascribed to want, Dr. Cunningham considers the existence of morbid conditions which may be termed "famine diarrhœa" and "famine dysentery" to be established. He adds that "where once the complex structures of "the intestinal mucous membrane have been so seriously affected by degenerative "changes dependent on insufficient nourishment, they cannot be renewed, and no diet, "however careful and generous it be, can be of any avail when once the means by "which alone it can be appropriated to the necessities of the body have been "destroyed."

Nos. 8, 13, 33. 8. We would invite your Lordship's attention to two decisions with reference to the method of dealing with charges incurred for famine relief, of which copies are enclosed. In one, it has been distinctly affirmed, in reply to a remonstrance from the Government of Bombay to a previous order of the Financial Department, that a Local Government must exhaust its entire resources, provincial and local, in contending against the calamity of famine before Imperial aid can be afforded, but that, on the other hand, the Imperial Government will, at the conclusion of the emergency, make such a contribution as may suffice to secure the Local Government from actual insolvency. The second
No. 41. decision is to the effect that all outlay on Public Works executed for relief purposes shall be in the first instance debited in the Public Works accounts to a suspense head of account, termed "famine relief," and that of the whole sum thus recorded, the portion which represents the value of the work done, at normal rates, shall be ultimately recorded under the head "Public Works," the remainder being transferred to the head "famine relief."

9. We are glad to be able to report that the prospects of the season continue favourable. Fair general rain has fallen in all distressed districts of Bombay except Kaladgi. In Mysore showers have been pretty general in the plains, but more rain is to be desired. In Madras showers, and in some taluks a fair rainfall, are reported from almost all districts, which are probably sufficient, considering what has fallen already, to meet the present wants of most tracts. Apprehensions of an unfavourable monsoon in

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Kurnool and Cuddapah are, however, entertained. The numbers in receipt of relief are as follows:—

In Madras	836,329 on relief works. 507,433 charitably relieved.
In Mysore	56,781 on relief works. 110,805 charitably relieved.
In Bombay	324,491 on relief works. 173,372 charitably relieved.

We have, &c.

(Signed) LYTTON.
F. P. HAINES.
E. C. BAYLEY.
ALEX. J. ARBUTHNOT.
A. CLARKE.
J. STRACHEY.
E. B. JOHNSON.
WHITNEY STOKES.

No. 61. Encl. in No. 79.

No. 3,454—69 G., dated Bangalore, 2nd July 1877.

From the Officiating Secretary to the Chief Commissioner of Mysore to the Additional Secretary to the Government of India.

I am desired to acknowledge the receipt of your letter No. 504, of the 8th ultimo, in which, after setting forth certain inferences to be drawn from a review of the figures supplied in the special famine reports furnished from this office, you remark that the apparently peculiar condition of affairs at the present juncture "of the prevailing distress "in this Province, demands the most careful consideration of the Chief Commissioner, "made by means of specially deputed officers, &c., with the view of ensuring on the "one hand that all that can work shall be forced to do so, and on the other, that "charitable relief may reach all who are really in need of it without too great con-"centration of recipients and its concomitant evils and abuses." No. 34.

2. It may be convenient, Mr. Saunders considers, that the Government of India should be furnished with a brief resumé of the measures which have been taken to supervise and control the administration of relief.

3. In the Nundydroog division, comprising the three districts of Bangalore, Tumkur, and Kolar, the Deputy Commissioners have been generally relieved of the heavier portion of their magisterial duties, and divested temporarily of the powers they have exercised in disposing of sessions cases of a certain class under section 36 of the Criminal Procedure Code, thus setting them free for bestowing greater attention to purely administrative work. Up to the 10th June last, the Civil courts having been kept closed as long as it was practicable to do so, the Deputy Commissioners were aided by the Judicial Assistant Commissioners and Munsiffs and their establishments, in superintending famine relief operations, and the services of these officials are still retained for these duties so far as is compatible with the work of their courts. In Bangalore itself, where several large relief camps or kitchens have been established, owing to the large influx of people to this centre, their supervision has been vested in a Central Executive Relief Committee, of which Mr. Gordon, the Judicial Commissioner, is President. In the Bangalore district proper, the Deputy Commissioner is aided by his several assistants, one of whom is a European officer. In the Kolar district, the Deputy Commissioner's hands have been strengthened by the deputation of an additional Assistant Commissioner, and the Munsiffs who are zealous and able officers are still able to afford him their assistance. In the Tumkur district, the Deputy Commissioner's efforts have been ably seconded by two European officers temporarily transferred from the Mysore Revenue Survey.

4. In the Ashtagram division, the local distress has been confined chiefly to parts of one district, Hassan, and to several taluks of the Mysore district. The Commissioner, Colonel Hay, by constant visits to all parts of his division, has been able with the zealous co-operation of the district officers to cope with requirements in that division without further aid; but while the distress has been comparatively restricted in this division, the difficulty of dealing with it has been aggravated by the migration, through

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the Mysore and Hassan districts of large bodies of labourers with their families who were tempted by the prospects and expectation of finding both employment for themselves and pasturage for their cattle in the hill districts of the Wynaad, Coorg, and Manjarabad. As the Government are aware, the supply of labour in those districts is almost wholly obtained in ordinary years from this Province, and though efforts have been made to arrest the stream, and prevent the movement in that direction of persons who were not under engagements to work on the estates, or who were physically unfit for such employment, it has not been found practicable to effect this object as effectually as could be wished. To aid the Commissioner, the services of two European officers of the Mysore Revenue Survey have been placed at his disposal, and more recently, Captain Clerk in charge of the Coorg Survey (which is now in recess) has been deputed for special work under Colonel Hay's orders.

5. In the Nagar division the Chitaldroog district alone is wholly affected; the Kadur Shimoga districts being only partially so. In the Chitaldroog district the Deputy Commissioner has been aided for several months past by a European officer of the Mysore Revenue Survey, and in the Shimoga district the Deputy Commissioner has the assistance of two European Assistants, in addition to his ordinary complement of Native Assistants.

6. The Chief Commissioner has reason to believe that the means taken as above shown to supplement the agencies at the disposal of the divisional and district officers, without looking for aid outside the administration, have been and are on the whole adequate to the purpose in view, but it cannot be denied that the energies of all these officers have been severely strained, and that it is due to the strenuous and hearty exertions of all concerned that the difficulties with which they have had to contend have been, as Mr. Saunders hopes, so far successfully grappled with.

7. It is necessary to add, however, that there are certain circumstances connected with the Bangalore district which have occasioned the Chief Commissioner some anxiety. The disproportionate number of persons who are being gratuitously fed in this district as well as the large expenditure incurred both under this head and on relief works, has attracted the attention of the Government of India. It is true, as has been explained by the Deputy Commissioner, that the inducements which have naturally attracted the people to flock into Bangalore, populated as it is by wealthy natives as well as by a large body of European residents, have led to a large number of distressed persons being thrown upon the relief kitchens in the district, but this reason does not sufficiently explain why such considerable numbers, ascertained to belong to the district, have had recourse to the charity of Government; and inquiries have been set on foot to elucidate the point. The matter is viewed by the Chief Commissioner as important also in so far as it appears that while the ratio of those gratuitously fed to the total population is as 1 to 53 in the Madras Presidency (the affected districts), and as 1 to 58 in the Bombay Presidency, the ratio is as 1 to 46 in Mysore. But if the figures relating to the Bangalore district (not including those of the Bangalore Municipality) as taken from the special famine report No. 19,* be eliminated, the proportion of gratuitously fed to population in this Province is as 1 to 58, being precisely equivalent to that prevailing in the Bombay Presidency.

* For the week ending 16th June 1877.

8. On the subject of the method adopted in respect of affording the distressed people employment on relief works, the Chief Commissioner conceives that a brief explanation may be desirable, with reference to the remarks made in paragraph 8 of your letter under reference. The course followed in this Province has been to provide such works as far as possible within easy reach of the homes of the people, in those localities where the distress has been most felt. A reduced task work was exacted in respect of all who were not sufficiently able-bodied to undertake employment on works in progress under the Public Works Department. In this manner, numerous petty works, such as sinking or deepening wells, excavating silt from tank beds, have been opened and carried out from funds assigned to some extent from local funds, but chiefly from famine grants. Road projects have been taken up to some extent, but in a Province so largely intersected by roads already, an objection has been felt to prosecuting works of this kind too actively, with the certainty of imposing an undue burden on the district funds in their maintenance hereafter. As a circumstance bearing on this subject, it may be needful to state also that, in a large number of the relief camps—certainly in all those where the numbers being gratuitously fed are large—light work is provided for those inmates who are capable of it, by employing them in collecting and breaking road metal, gravel, and in other ways. The advantage of this arrangement is that useful work is provided under more efficient supervision than it is always practicable to secure for petty and scattered relief works.

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No. 62.

Telegram, dated 6th July 1877.

From Governor of Bombay to Secretary of State for India.

No rain of consequence since last telegram. Situation not improved. Prices of grain high. Still numbers on relief works decreasing, and agriculture progressing in all distressed districts save Kaladgi, regarding which anxiety felt. Monsoon not yet begun in Guzerat, nor in Nizam's Deccan, nor in neighbouring parts of Madras, all which slightly aggravates Bombay position.

No. 63. Encl. in No. 79.

Telegram, dated 6th July 1877.

From Revenue Additional Secretary, Simla, to Revenue Additional Secretary, Madras.

Governor-General in Council considers it of utmost importance in order to give confidence to merchants, and prevent discontinuance of shipments, that all procurable information regarding stocks, consumption, and growing crops should be made public. His Excellency therefore requests Madras Government will obtain as soon as possible and publish in "Government Gazette," as regards each distressed district or smaller convenient division, first, anything known about quantity of local stocks; secondly, the imports and exports of grain; thirdly, the estimated daily consumption of food grain by the population dependent on each principal market; fourthly, the condition of the growing crops of food grains. Similar information should be published fortnightly in future, and as crops reach maturity their probable out-turn should be given as far it can be roughly estimated.

No. 64. Encl. in No. 79.

Telegram, dated 7th July 1877.

From Revenue Additional Secretary, Simla, to Secretary, Chamber of Commerce, Calcutta.

Governor-General in Council thanks chamber for valuable letter of 29th ultimo, and will gladly afford all information procurable, but it must be remembered that ascertainment of existing stocks and estimate of out-turn of growing crops on vast areas is most difficult. Government of Madras have been requested to ascertain and publish in "Madras Government Gazette," as regards each distressed district, first, anything known about quantity of local stocks; secondly, the imports and exports of grain; thirdly, the estimated daily consumption of food grain by the population dependent on each principal market; fourthly, the condition of the growing crops of food grains. Madras Government have also been told that similar information should be published fortnightly in future, and as crops reach maturity their probable out-turn should be given as far as it can be roughly estimated. Chief Commissioner, Mysore, has been similarly requested. Government India consider that importations on a large scale into the Madras Presidency may be expected to last until the reaping of the new harvest, that is, September and October, and that if the harvest be good they will then probably return by December to their normal average.

No. 65. Encl. in No. 79.

No. 585, dated Simla, the 7th July 1877.

From the Additional Secretary to the Government of India to the Secretary to the Bengal Chamber of Commerce.

In reply to your letter of the 29th ultimo, I have the honour to enclose post copy of a telegram addressed to you yesterday, which his Excellency the Governor-General in Council trusts will meet the wishes and suggestions of the Chamber of Commerce.

I am directed to add that his Excellency in Council feels considerable doubts whether district officers generally have as good means of ascertaining the extent of stocks, and of estimating probable out-turn of crops as are possessed by the up-country agents of mer-

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cantile firms deeply interested in the issue, and having access to many private sources of communication. In the case of district officers in the distressed districts of Madras the difficulty will be enhanced by the multifarious and onerous duties now falling upon them.

No. 66.

Telegram, dated 8th July 1877.

From Viceroy to the Secretary of State.

No despatch this week. Prospects scarcely so favourable in Madras: no rain in Salem, Trichinopoly, Madura; fair in parts of Bellary, Kistna, Tinnevelly, Coimbatore; very slight elsewhere. In Mysore no rain; standing crops beginning to suffer. In Bombay, rain still insufficient in Kaladgi and extreme east, where young crops withering. Elsewhere in Bombay crops good and agriculture spreading. Number relieved,—In Madras, 850,000 on works; 537,000 charitably. In Mysore, 52,000 on works; 116,000 charitably. In Bombay, 297,000 on works; 173,000 charitably. Temple telegraphs thus:—"Prices still slightly rising, specially in Kaladgi, where imports are checked by "the employment of cattle on agriculture; imports of grain by steamer to coast con- "siderable, by rail steady. Condition of people good; cattle improving. General "improvement continues, and would be greater if monsoon were more steady, and rain- "fall extended better eastward. Nearly 100,000 persons voluntarily left works last "three weeks." We anticipate from Bombay reports possible saving of 40 lakhs on estimate for that Presidency.

Encl. in No. 79.

No. 67.

Extract from the Proceedings of the Government of Bombay in the Public Works Department (Local), No. 190 P., dated 8th July 1877.

Resolution.—His Excellency the Governor in Council is pleased to issue the following orders for the guidance of the Collector and of the Executive Engineer in the Kaladgi Collectorate. If rain should not have fallen, or if from appearances it is not immediately expected when these orders are received, and if the price of staple grain is dearer than a rupee for 9 lbs., then wherever such prices may prevail, an equivalent for the Sunday's wage should be allowed, both on Public Works Department and Civil agency relief works, by adding an increment to the week days' wages.

2. Should rain continue to hold off, the Collector should be careful not to turn away people off the works who are not actually wanted for agriculture. He should also secure that facilities are given for taking people on to relief works, and that the machinery for village inspection is maintained in its fullest vigour, so that all people who are falling deeper into want may be brought before Relief Officers; the Collector should be informed that he will be held absolutely answerable in this respect, and his attention should again be drawn to Government Resolution No. 260 E.—852, Local, dated 16th April 1877.

3. As an example of the increment to be paid under these orders, the following is given, the price of grain being assumed to be 8 lbs. per rupee:—

On Public Works Department Works.

	Pay per working day, according to the table accompanying Government Resolution No. 268 C.W. —1038, Local, of 13th December 1876.	Increment as ordered, being one-sixth of the daily pay.	Total pay per working day.	
	A. P.		A. P.	
Man	3 0	0 6	3 6	
Woman	2 6	0 5	2 11	
Boy or girl employed upon the works	1 6 or 2 annas at the discretion of the directing officer.	0 3 or 4 pies at the discretion of the directing officer.	1 9 or 2 a. 4 p. at the discretion of the directing officer.	Mean of these rates, or 1 as., probably sufficient in all ordinary cases.

On Civil Agency Works.

Man	2 6	0 5	2 11	
Woman	2 3	0 4½	2 7½	
Boy or girl employed upon the works	1 3 or 1 a. 6 p. at the discretion of the directing officer.	0 2½ or 3 pies at the discretion of the directing officer.	1 5½ or 1 a. 9 p. at the discretion of the directing officer.	The higher rates might here be given.

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No. 68.

No. 2271A-228A, dated Fort St. George, 10th July 1877.

Enci. in No. 288

From the Additional Secretary to Government of Madras to the Additional Secretary to the Government of India.

With reference to your telegram of the 22nd ultimo, requesting that a complete set of death returns for all distressed districts, from July 1876 up to the latest date of receipt in each case, may be sent to you as soon as possible, I am directed to forward the enclosed statement received from the Sanitary Commissioner giving the required information up to the end of April last.

Return showing the Deaths in the Distressed Districts of the Madras Presidency, from July 1876 to April 1877.

Districts.	Population.	Diseases.	1876.						1877.			
			July.	August.	September.	October.	November.	December.	January.	February.	March.	April.
Nellore	1,376,811	Cholera	357	533	638	465	997	3,884	8,816	4,802	1,556	545
		Small-pox	18	6	34	17	38	102	399	491	482	513
		Fevers	716	626	745	735	959	912	897	926	794	773
		Bowel complaints	56	41	44	36	31	52	118	77	70	35
		Other causes	554	517	578	564	635	694	912	1,056	737	902
		Total	1,701	1,723	2,039	1,817	2,660	5,644	11,142	7,352	3,639	2,768
Madras	397,552	Cholera	231	240	61	30	98	464	1,635	1,140	650	465
		Small-pox	35	37	36	28	10	67	200	893	1,738	1,441
		Fevers	144	150	219	218	204	245	313	402	552	445
		Bowel complaints	165	202	180	151	151	452	713	966	1,030	843
		Other causes	645	701	643	736	702	806	882	1,000	1,054	884
		Total	1,220	1,330	1,137	1,163	1,165	2,034	*3,743	4,401	5,024	4,078
Chingleput	938,184	Cholera	182	177	110	56	60	191	1,275	413	266	154
		Small-pox	27	33	32	24	30	71	165	309	719	693
		Fevers	505	488	483	480	494	651	759	641	739	586
		Bowel complaints	655	404	237	144	286	806	2,455	1,439	929	520
		Other causes	869	806	772	745	882	1,146	1,440	1,549	1,483	1,037
		Total	2,238	1,908	1,634	1,449	1,752	2,865	6,094	4,351	4,136	2,909
Madura	1,328,231	Cholera	21	..	63	46	140	701	1,680	914	1,069	1,075
		Small-pox	129	123	146	127	133	198	295	289	432	340
		Fevers	905	809	819	823	855	982	909	654	705	711
		Bowel complaints	164	134	134	126	120	136	147	110	149	158
		Other causes	985	662	698	743	727	844	727	613	675	722
		Total	1,904	1,728	1,860	1,865	1,975	2,861	3,758	2,580	3,030	3,006
Kurnool	959,640	Cholera	1,211	423	169	38	876	6,042	1,989	1,463	2,008	1,717
		Small-pox	81	25	26	27	46	121	181	349	468	342
		Fevers	1,273	1,278	1,212	1,194	1,698	3,551	2,571	1,876	2,176	2,600
		Bowel complaints	63	75	51	29	58	80	74	76	98	96
		Other causes	837	592	316	247	379	2,068	1,488	1,483	377	509
		Total	3,465	2,393	1,774	1,535	3,057	11,862	6,253	5,247	5,127	5,264
Cuddapah	1,351,194	Cholera	1,520	1,232	1,102	540	970	3,777	9,924	8,216	3,561	2,235
		Small pox	107	76	67	91	106	188	371	422	714	776
		Fevers	1,416	1,480	1,578	1,493	1,726	3,038	2,314	2,109	2,658	2,770
		Bowel complaints	53	70	64	57	62	104	141	153	105	140
		Other causes	406	434	417	386	434	505	610	531	647	681
		Total	3,502	3,292	3,228	2,567	3,298	6,612	13,360	11,431	7,685	6,602
Bellary	1,668,006	Cholera	1,970	1,010	335	166	1,341	2,858	4,191	6,953	6,945	3,415
		Small-pox	105	96	98	89	193	380	500	897	1,209	856
		Fevers	705	749	730	724	799	980	1,163	1,225	1,397	1,314
		Bowel complaints	172	157	144	113	216	234	251	334	380	296
		Other causes	2,453	2,442	2,289	2,004	2,374	2,988	3,256	3,556	4,075	4,159
		Total	5,405	4,454	3,566	3,096	4,923	7,440	9,361	12,965	14,006	10,040

* 316 cases from Monegar Camp are not included, as no particulars were received.

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RETURN showing the DEATHS in the DISTRESSED DISTRICTS of the MADRAS PRESIDENCY—*cont.*

Districts.	Population.	Diseases.	1876. July.	August.	September.	October.	November.	December.	1877. January.	February.	March.	April.
North Arcot	2,015,278	Cholera	1,375	594	214	688	853	2,471	9,605	8,432	5,657	2,731
		Small-pox	36	15	27	45	75	135	227	213	250	306
		Fevers	1,429	1,467	1,359	1,228	1,291	1,600	1,680	1,593	1,591	1,623
		Bowel complaints	143	127	124	87	128	166	202	172	178	153
		Other causes	1,325	1,374	1,243	1,202	1,389	1,674	1,972	1,759	1,946	1,664
		Total	4,308	3,577	2,967	3,245	3,736	6,046	13,686	12,169	9,622	6,477
Salem	1,966,995	Cholera	411	293	152	124	903	3,928	6,788	7,158	8,523	6,875
		Small-pox	48	24	23	29	34	44	82	108	171	276
		Fevers	1,449	1,316	1,254	1,239	1,284	1,538	1,588	1,493	2,043	2,091
		Bowel complaints	113	129	88	97	129	141	180	169	191	297
		Other causes	1,224	1,077	1,141	1,072	1,157	1,387	1,620	1,488	2,019	2,424
		Total	3,245	2,839	2,658	2,561	3,507	7,038	10,258	10,416	12,947	11,963
Coimbatore	1,763,274	Cholera	119	73	22	9	321	2,157	3,032	3,990	3,093	3,926
		Small-pox	9	12	13	16	16	25	58	80	103	79
		Fevers	931	897	901	915	973	974	865	769	945	922
		Bowel complaints	218	189	204	225	174	187	231	173	187	276
		Other causes	812	829	842	854	837	980	831	823	784	826
		Total	2,089	2,000	1,982	2,019	2,321	4,323	5,017	5,835	5,112	6,029

No. 69.

Telegram, dated 12th July 1877.

From GOVERNOR OF MADRAS to the SECRETARY OF STATE FOR INDIA.

South-west monsoon so far very inadequate over wide area causing great increase distress. Recently sown crops in many districts reported withering. Prices still tending upwards.

Encl. in No. 79.

No. 70.

Telegram, dated 12th July 1877.

From REVENUE SECRETARY, Madras, to the ADDITIONAL SECRETARY TO THE GOVERNMENT OF INDIA.

Your telegram of 6th. All possible reliable information will be published as requested; prices, imports, and movements of grain are communicated to press. Information as to stocks in districts too unreliable to publish authoritatively; any actual shortness of stock has been communicated to Chamber of Commerce.

No. 71.

Telegram, dated 13th July 1877.

From SECRETARY OF STATE to VICEROY.

Bad accounts of weather and prices from Madras. Have you any information?

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No. 72.

Telegram, dated the 13th July 1877.

From Governor of Bombay to the Secretary of State.

No material improvement since last telegram. Monsoon still suspended, causing anxiety. Prices rising generally, in some parts expensively dear, aggravating distress.

Partial rain has fallen in eastern tracts of Deccan. Numbers on relief works still decreasing, but increasing on gratuitous relief in many places. Importation of grain maintained well. Human labour employed carrying grain, cattle being engaged for agriculture.

No. 73.

Encl. in No. 79.

No. 600, dated Simla, 13th July 1877.

From the Additional Secretary to the Government of India to the Chief Commissioner of Mysore.

With reference to your Secretary's letter, No. 3,454–69G., dated the 2nd instant, which has been laid before his Excellency the Governor-General in Council, I am directed to point out that no explanation has been afforded on the subject of paragraphs 4 and 5 of my letter No. 504 of the 8th ultimo as to the amounts sanctioned and those expended, or on the first and second points noticed in paragraph 7.

No. 74.

Encl. in No. 79.

No. 598, dated Simla, the 13th July 1877.

From the Additional Secretary to the Government of India to the Chief Commissioner of Mysore.

With reference to your famine report for the week ending 23rd June, I am directed to state that his Excellency the Governor-General in Council has observed with surprise that a system so unsuited to famine times as paying coolies only once in 15 days exists in the Province of Mysore, and has continued so long without attracting notice. This practice alone would go far to account for the small numbers on works under Public Works agency and for the eventual swelling of the numbers in need of charitable relief. His Excellency in Council desires that bi-weekly, and where distress is extreme, daily payment may be substituted as soon as possible.

2. The attention of the Madras Government has been invited to the remarks in paragraph 7 regarding the arrangements of the railway company in favour of certain merchants.

3. His Excellency the Governor-General in Council also observes that the report of the Commissioner of the Ashtagram Division for the month ending 15th May was not despatched till the 26th idem, dealt with until 12th June, or forwarded to the Government of India till 30th June, and considers that all famine matters should be disposed of with the utmost promptitude.

No. 75.

Encl. in No. 79.

Telegram, dated 13th July 1877.

From the Additional Secretary to the Government of India, Simla, to the Revenue Secretary, Madras.

Your telegram of 12th very satisfactory. Publication in Gazette in addition to communication to press and Chamber desirable for information of Bengal and elsewhere.

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75ª. Encl. in No. 79.

STATEMENT of the PRICES of FOOD-GRAINS in Seers per Rupee in the MADRAS distressed Districts.—1877.

Districts.	Rice on the						Cholum on the						Raggi on the						Cumboo on the					
	31st March.	5th June.	19th June.	26th June.	3rd July.	10th July.	31st March.	5th June.	19th June.	26th June.	3rd July.	10th July.	31st March.	5th June.	19th June.	26th June.	3rd July.	10th July.	31st March.	5th June.	19th June.	26th June.	3rd July.	10th July.
Kistna -	8·26	8·45	8·66	8·63	8·58	8·42	10·97	11·15	11·15	11·1	11·1	10·45	13·9	12·94	12·96	12·95	12·81	11·33	10·53	10·38	10·77	10·65	10·7	10·05
Nellore -	7·87	7·78	7·72	7·74	7·66	7·28	10·	9·64	9·85	9·89	9·54	9·28	11·88	11·74	11·8	11·82	11·45	10·79	9·8	10·06	10·37	10·25	9·85	9·54
Cuddapah -	7·91	7·73	7·16	7·16	6·99	6·3	9·53	8·66	8·34	8·41	8·49	7·92	9·91	9·25	9·32	9·38	9·43	8·72	8·36	8·92	8·54	8·49	8·69	7·72
Bellary -	7·41	6·83	6·71 7·56*	6·48 7·83*	6·34 7·56*	5·86 6·21*	9·05	7·56	7·03 7·73†	6·55 7·73†	6·72 8·24†	6·35 6·95†	9·3	8·25	7·76	7·32	7·35	7·13	8·64	7·29	7·22	6·77	6·94	6·25
Kurnool -	7·29	6·95	6·95	6·67	6·53	6·05	8·79	8·06	7·84	7·48	7·55	7·19	9·92	9·51	9·39	8·79	8·83	8·23	8·88	8·92	8·92	8·91	9·24	8·28
North Arcot	8·58	7·9	7·4	7·4	7·4	6·8	10·58	8·9	8·4	8·4	8·4	8·	10·38	9·8	9·4	9·2	8·9	8·2	8·91	8·2	7·8	7·8	7·7	7·5
Chingleput -	9·4	8·9	8·46	8·34	8·26	6·91	10·98	9·05	9·05	9·05	9·05	8·59	11·26	10·72	10·08	9·92	9·77	8·31	10·78	—	—	—	—	—
Trichinopoly	8·12	7·6	$7\frac{3}{5}$	$7\frac{2}{5}$	$7\frac{2}{5}$	$6\frac{3}{5}$	16·8	13·2	$13\frac{3}{10}$	13·	13·	$16\frac{4}{5}$	10·87	10·3	$10\frac{3}{5}$	$10\frac{3}{5}$	$10\frac{3}{5}$	$9\frac{3}{5}$	10·32	9·7	$9\frac{5}{6}$	$9\frac{2}{3}$	$9\frac{2}{3}$	$8\frac{9}{0}$
Madura -	8·47	8·2	$8\frac{3}{10}$	$8\frac{3}{10}$	$8\frac{1}{5}$	$7\frac{1}{2}$	12·15	10·4	$10\frac{3}{5}$	$10\frac{7}{10}$	$10\frac{1}{5}$	$10\frac{3}{16}$	10·46	9·8	$9\frac{9}{10}$	$9\frac{4}{5}$	$9\frac{9}{10}$	$9\frac{2}{5}$	11·08	9·7	$10\frac{3}{5}$	$9\frac{4}{5}$	$10\frac{1}{10}$	$9\frac{1}{2}$
Tinnevelly -	8·4	8·25	8·	8·	8·	8·	9·	11·25	$11\frac{1}{2}$	$11\frac{1}{4}$	$11\frac{1}{2}$	11·	11·47	10·75	$10\frac{3}{4}$	10·	$10\frac{1}{4}$	$9\frac{1}{2}$	10·85	11·	$10\frac{3}{4}$	11·	$11\frac{1}{2}$	$11\frac{1}{2}$
Coimbatore -	7·62	7·4	7·35	7·33	6·51	6·82	9·14	8·41	8·32	8·22	8·22	7·75	9·55	8·89	8·79	8·63	8·63	8·79	10·61	8·61	8·27	8·61	9·07	9·09
Salem -	7·7	7·43	$7\frac{3}{16}$	$7\frac{1}{8}$	$6\frac{3}{4}$	$6\frac{1}{8}$	9·09	9·	$8\frac{13}{16}$	$8\frac{3}{8}$	$8\frac{5}{16}$	$7\frac{1}{2}$	9·26	8·81	$8\frac{13}{16}$	$8\frac{11}{16}$	$8\frac{1}{8}$	$7\frac{1}{4}$	8·93	8·12	$7\frac{15}{16}$	$7\frac{15}{16}$	$7\frac{9}{16}$	$6\frac{7}{8}$
South Arcot	—	8·75	$8\frac{1}{4}$	8·	8·	$7\frac{3}{8}$	—	11·	$10\frac{3}{4}$	$10\frac{1}{2}$	$10\frac{1}{4}$	$9\frac{1}{2}$	—	11·5	$11\frac{1}{10}$	11·	$10\frac{3}{4}$	$10\frac{1}{8}$	—	11·75	$11\frac{1}{2}$	$11\frac{1}{4}$	$11\frac{1}{4}$	$10\frac{1}{4}$
Tanjore -	—	8·	$7\frac{3}{4}$	$8\frac{1}{4}$	$8\frac{7}{8}$	$7\frac{9}{16}$	—	10·	$9\frac{3}{4}$	$9\frac{5}{8}$	$10\frac{1}{2}$	$9\frac{7}{16}$	—	12·18	$10\frac{7}{16}$	$10\frac{1}{2}$	$10\frac{1}{4}$	$10\frac{7}{16}$	—	10·81	$11\frac{7}{16}$	11·	11·	11·

* Boiled.

† Jubbulpore.

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No. 76.

Encl. in No. 103.

Dated Calcutta, 14th July 1877.

From the SECRETARY TO BENGAL CHAMBER OF COMMERCE to the ADDITIONAL SECRETARY TO THE GOVERNMENT OF INDIA.

The Committee of the Chamber of Commerce desire me to convey their respectful acknowledgment of the reply which his Excellency the Governor-General in Council was pleased to transmit by telegraph on the 6th instant to their representation of 29th of last month, and to state that the full information therein communicated will serve in a very great measure to guide the operations of merchants who may be interested in supplying the wants of the famine districts of Madras.

The Committee also desire me to thank you for your letter No. 585, of 7th instant. They are quite sensible of the difficulties in the way of officers in those districts, and would not desire to burden them with superadded laborious service; and probably the enterprise and industry of merchants will enable them to ascertain for themselves the information which the district officers would, no doubt, have cheerfully obtained had their present duties been less pressing.

The Committee further desire me to say that, with the view to the largest publicity being given to the reply with which they have been honoured, they have requested the daily papers to publish the correspondence.

No. 77.

Telegram, dated 15th July 1877.

From the VICEROY to the SECRETARY OF STATE.

Your telegram of 13th. Prospects of season continue unfavourable. Situation undoubtedly critical in Madras. No rain last week, except slight showers in parts Bellary and some southern districts. Recently sown crops withering in many quarters. Prices Madras still rising, principally of rice, but pound of grain still procurable for 1 anna in almost all distressed districts, and there are few parts where rice is the only grain to be got, moreover nowhere yet so high as in Kaladgi, Dharwar, Belgaum, of Bombay.

No. 78.

Telegram, dated 15th July 1877.

From the VICEROY to the SECRETARY OF STATE.

To-morrow's Despatch covers more papers by Cornish and Lyon. Condition: Mysore still critical; rainfall trifling. Rice selling at 11⅔ lbs. per rupee at Bangalore, and higher in districts. Distress increasing. Standing crops suffering; unless rain soon, season will be lost. Of Bombay, Temple telegraphs as follows on 13th:— "Monsoon break continues, causing anxiety in districts, chiefly Kaladgi, where previous "rainfall insufficient. No harm yet where previous rainfall sufficient, but everywhere "more wanted. Sowing and agriculture proceeding in tract where rain was best. In "south, quick growing crops and vegetables sown with early rain coming to market. "Prices rising, especially Kaladgi and south districts, where imports impeded by em- "ployment of cattle in fields. People, eastern districts, conveying grain by head loads "from markets to remoter parts. Movement is healthy and facilitates imports, and "gives profitable occupation to many. Imports by coast trifling; by rail full. Con- "dition of cattle improving, except extreme east. General improvement continues, "and will be greatly accelerated by good rainfall, now probably near. Last four weeks "labourers reduced 124,002." Message ends. At request of Bengal Chamber of Commerce, we have requested Madras Government to publish regularly all information procurable regarding stocks, exports and imports, consumption of food grain, and condition of standing crops; also their weekly reports. Numbers relieved are as follows:— In Madras, 866,000 on works; 581,000 charitably. In Mysore, 50,000 on works; 120,000 charitably. In Bombay, 275,000 on works; 169,000 charitably. Prices and condition of Madras reported in separate telegram.

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No. 79.

No. 29 of 1877.

From the GOVERNMENT OF INDIA, Department of Revenue, Agriculture, and Commerce, to the SECRETARY OF STATE FOR INDIA.

Simla, the 16th July 1877.

Nos. 21, 28. We enclose for your Lordship's information two reports by Dr. Cornish, and a demi-official letter from Dr. Lyon, on the vexed subject of famine wages. In the first of his reports Dr. Cornish dwells on the difficulty of testing the effects of the reduced wage which is occasioned by the constant changes in the *personnel* of the gangs and the slowness of the process of destruction of life through chronic insufficiency of food. In his second report Dr. Cornish combats the views of Dr. Lyon set forth in the memorandum which we submitted to your Lordship with our Despatch No 24, dated the 17th May last, and adds that the data of Dr. Lyon's paper do not justify the conclusion which the Bombay Government have founded on it, that a ration based on 1 lb. of grain is sufficient for persons not performing severe labour. Dr. Lyon's demi-official letter
Nos. 29, 48. brings to notice a letter of Dr. Dymock regarding the experiences of the French on a bare subsistence ration during the siege of Paris.

2. Your Lordship will have learned, from paragraph 2 of our Despatch No. 26, of the 11th ultimo, that the large preponderance of the charitably relieved in the Province of Mysore, which is alluded to in paragraph 3 of your Lordship's Despatch No. 46 of June 7th, had already attracted our attention. We now enclose the reply of the Chief
Nos. 61, 73, 74. Commissioner to the reference we had made to him and a call for further explanations which we have found it necessary to make, as also a communication regarding the practice of paying the relief labourers only fortnightly, which has come to light. We regret to say that the condition of the Province continues critical, as shown by the following telegram from the Chief Commissioner, dated the 12th instant :—

"Rainfall at Bangalore 35 cents, Coorg 1·78 inches. Ordinary rice selling at Bangalore at 11½ lbs. per rupee. Prices unprecedentedly high in the districts, and distress greatly on the increase. Standing crops have already suffered, and unless rain falls, of which there are no signs, the cultivating season will be lost."

No. 45. 3. With reference to paragraph 7 of our Despatch No. 24, of May 17th, we beg to enclose a copy of the reply of the Madras Government to our letter on the subject of reducing the numbers in the relief camps. The question is one which must be left to the discretion of the Madras Government, but we observe that in the present week the Collector of Salem reports that the number in the relief camps there has risen 15 per cent. through the revised scale of diet and the consequent popularity of the camps, and we cannot but think that the system of discouraging the receipt of relief by any except those absolutely in need which is being carried out in Bombay, as shown in a Resolution
Nos. 1, 47. of which a copy is enclosed, combines sufficient relief with necessary economy.

No. 58. 4. We submit for your Lordship's information a letter from the Bengal Chamber of Commerce, which has been elicited by the publication of the correspondence with the Government of Madras which was reported in our Despatch No. 28 of the 2nd instant. In consequence of this letter we requested the Madras Government to publish in the
Nos. 63 to 65, 70, 75. "Fort Saint George Gazette" as much of the information desired by the Chamber as appeared practicable, and are glad to learn that there will be no difficulty in doing so. We have also requested that Government to publish their weekly relief reports, so that the grain trade in Bengal and elsewhere may receive information earlier than is possible
No. 75ª. through the "Gazette of India." In connexion with this subject we append statement of the prices of the four principal food grains in Madras at various dates from March 31st up to last week. The continued rise is serious, but a pound of grain can still be obtained for 1 anna in almost all the distressed districts, and there are probably but few parts where rice, which is the most expensive grain, is alone procurable. Prices in Madras, moreover, are nowhere yet so high as in the most distressed districts of Bombay, where they stood as per margin by the last accounts, and the Bombay Government had, in consequence, added payment for Sundays to the previous wage.

Belgaum - -	5½ to 6 seers
Dharwar - -	5⅜ „
Kaladgi - -	4¾ to 5 „

No. 67.

5. We regret to state that the prospects of the season continue very unfavourable. The condition of Mysore has been already referred to. In Madras there has been no rain during the week, except slight showers in parts of Bellary and some of the southern

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districts, and the recently sown crops are withering in many quarters. Of Bombay Sir Richard Temple telegraphs on the 13th as follows:—

"Monsoon break continues, causing anxiety in districts, chiefly Kaladgi, where previous rainfall insufficient. No harm yet where previous rainfall sufficient, but everywhere more wanted; sowing and agriculture proceeding in tracts where rain was best. In south quick-growing crops and vegetables sown with early rain coming to market. Prices rising, especially Kaladgi and south districts, where imports impeded by employment of cattle in fields. People eastern districts conveying grain by head-loads from markets to remoter parts; movement healthy, facilitates imports, gives profitable occupation to many; imports by coast trifling, by rail full; condition cattle improving, except extreme east. General improvement continues; will be greatly accelerated by good rainfall now probably near; last four weeks labourers reduced 124,002."

The numbers in receipt of relief were, by the latest accounts, as follows:—

In Madras - -	865,752	on relief works.
	581,633	charitably relieved.
In Mysore - -	49,794	on relief works.
	120,251	charitably relieved.
In Bombay - -	274,521	on relief works.
	169,482	charitably relieved.

We have, &c.

(Signed) LYTTON.
E. C. BAYLEY.
ALEX. J. ARBUTHNOT.
A. CLARKE.
J. STRACHEY.
E. B. JOHNSON.
WHITLEY STOKES.

No. 80.

Encl. in No. 103.

Telegram, dated 19th July 1877.

From Viceroy, Simla, to his Excellency Col. Anson, Singapore.

The drought which prevailed during the past season throughout large portions of the Madras and Bombay Presidencies and Mysore has caused great decrease in stocks of food grains throughout India, and consequent rise of prices. The prospects of the season now commencing are doubtful, the S. W. monsoon so far having been unfavourable, and there is every probability of continuance of high prices and demand for at least next three or four months. It is important to encourage immediate imports of rice from the Straits, Cochin China, and Siam. Please communicate this to your Chamber of Commerce, and also to French and Siamese Consuls, with request that they will inform Governor-General and King.

No. 81.

Telegram, dated 20th July 1877.

From Secretary of State to Governor of Madras.

What news of monsoon? We are very anxious.

No. 82.

Telegram, dated 20th July 1877.

From Governor of Bombay to Secretary of State.

Some improvement since last telegram.

Good rain Concan, Guzerat, Kattywar, Khandesh, extending to Berar. Partial rain in Deccan. Monsoon not properly restored. Numbers on relief slightly decreased. Prices high in consequence of bad news from Madras, Mysore, and Nizam's country.

Timely rain, if vouchsafed, would re-establish everything in Bombay Presidency.

Quantities of grains ready for despatch to distressed districts.

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Encl. in No. 164.

No. 83.

No. 620, dated Simla, 20th July 1877.

From the Additional Secretary to the Government of India to the Additional Secretary to the Government of Madras.

With reference to the proceedings of the Madras Government quoted in the margin, I am directed to state that his Excellency the Governor-General in Council considers that the system of a daily money dole is certain to lead to very extensive abuses, not merely on the grounds so forcibly set forth by the Collector of Nellore, but because the most recent of the orders quoted appear to leave the rates to be paid entirely at the discretion of the local officers.

No. 1,820, dated May 25th.
„ 1,830, „ „ 28th.
„ 1,979, „ June 13th.

2. I am accordingly directed to request that the orders sanctioning this mode of payment may be re-considered.

Encl. in No. 271.

No. 84.

Extract from Letter from W. H. Glenny, Esq., Sub-Collector of Bellary, to J. H. Master, Esq., Collector of Bellary, No. 273, dated 20th July 1877.

In continuation of my letter No. 171, dated 10th May 1877, and with reference to Board's proceedings, No. 3,244, dated 21st December 1876, I have the honour to submit report on the famine relief operations under my charge during March 1877, accompanied as usual by a statement received from the Range Officer exhibiting the estimated value of the work turned out, with marginal notes by me showing the cost thereof.

2. There is not much to say in this report. Relief operations in Adoni taluk were placed in charge of Mr. Oldham, B.C.S., on 7th. The great reductions in numbers and the concentration of our labour on one or two works in each of the other taluks (Tadpatry, Gooty, and Alur) rendered it possible for us to take systematic and stringent measures against fraud. Tadpatry taluk lagged behind in this respect. I found on the 20th March the old system, of allowing Revenue Inspectors to draw round sums of money on undetailed indents when they chose, going on in this taluk, accompanied by general laxness. I repeated my orders and an improvement ensued. Alur taluk was administered better than Tadpatry. In Gooty taluk Lieutenant Wilson, by great personal care and activity, brought about a crisis. The Revenue Inspectors, the rest of the paying establishment, and the maistries (*alias* Mustseddies) found that if they obeyed orders the fount of dishonest gain was sealed. A regular combination was formed to evade obedience. Declarations of sickness, of want of time, of inability to understand orders, were all tried. I need not go over the history of this dead-lock again. Of two circumstances one availed to tide us over it, and the other to keep our hands strong against the enemy. The first was an arrangement made for sweeping away the whole native paying establishment at a day's notice, and taking the duty of paying upon ourselves and the European Superintendents, in the event of a single member of the native establishment continuing to be contumacious. The second circumstance (which, however, did not occur within the month under report) was the Government's dismissal of Revenue Inspector Ongole Sreenevassa Row, which most judicious step probably astonished him as much as it did myself. Previously to our getting the upper hand of the conspirators, one of them, Akkarally Venkataramayya, a revenue settlement Gumastah, had starved some gangs by withholding pay from them, with fatal consequences in two cases. All this again is before Government.

3. On the 28th Sir Richard Temple paid Gooty a visit, and inspected some coolies. He also made inquiries into my arrangements for gratuitous relief of all kinds, viz., (1), permanent gratuitous relief at "selected" centres throughout the division; (2), casual or temporary relief at all villages other than "relief centres;" and (3), subsistence allowance at $\frac{1}{4}$ anna each to children of labourers. He was satisfied with the arrangements which had a short time before been thoroughly organised, and which are before the Board and Government.

4. Prices remained nearly stationary during the month. They were rather higher in Alur taluk than elsewhere. They ranged between about $8\frac{1}{2}$ and 10 local (2 lbs.) measures of inferior cholum for the rupee. The lower retail rates prevailed on market days at the larger villages. Markets continued well supplied.

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5. The rates of wages to labourers continued to be these of Scale No. II. of Government Order No. 329, dated 31st January 1877, viz., 1½ annas and 1¼ annas and ¾ anna for man, woman, and child. No Sunday wage was given. The children of labouring coolies too young to work received ¼ anna gratuity per diem. No deterioration in the physique of the coolies was apparent. Except those of the two persons referred to in paragraph 2 *supra*, no deaths from starvation came to light. It is not likely that any occurred; on the other hand, there were abuses on the side of lavishness (especially in Tadpatry taluk) when the advances for casual relief were first made to the Reddies of all villages other than "relief centres." This was to be looked for; it was soon checked with a fair amount of success.

No. 85.

Telegram, dated 21st July 1877.

From Governor of Madras to Secretary of State.

Monsoon west coast scanty; failed elsewhere. General condition became worse last week.

Average prices highest yet reached. Eleven districts above 7;* four above 6; retail in places 4 or 3. Some places short supplied and stocks exhausted. Imports insufficient although large. Recently sown crops reported failing. Mysore wants very heavy rain, but Madras Railway transport good.

Supplies and prices cause great anxiety. Rain reported on Bombay side, but no flood in Godavery.

No. 86.

Telegram, dated 21st July 1877.

From Governor of Madras to Secretary of State.

Must again earnestly press for all civilians being immediately sent out whose health permits. Return of elder men will release younger ones for famine duties. We are seriously shorthanded, several valuable officers knocked up or knocking up. Season reports most unfavourable everywhere.

No. 87.

Telegram, dated 23rd July 1877.

From Secretary of State to Governor of Madras.

Yours 21st. Of 15 years' service men, Bliss and Wild gone. Pearse leaves Venice 3rd August; Rice Southampton 9th August; possibly three more. Rest reported unfit. Will report result of further measures. Shall Madras military officers be ordered out?

No. 88.

Telegram, dated 23rd July 1877.

From Viceroy to Secretary of State.

Prospects continue generally unfavourable in Madras, Mysore, and Eastern Bombay. Some apprehensions of short rainfall were entertained regarding Behar, but during last three days good rainfall is encouraging. In North-West Provinces and Oudh rainfall as yet quite inconsiderable and causes serious anxiety. In Burma, Assam, Central Provinces, Berar, and Guzerat, rainfall good and prospects encouraging. In Hyderabad territory rain has ceased for some time past, and young crops reported withered.

Regarding Bombay, Temple telegraphs that monsoon is not yet fully established; rain good in Gujerat, Nasik, Khandesh, deficient in Southern and Eastern districts, where, if general fall be much longer delayed, young crops will suffer, except over limited areas where heavy partial showers have fallen. Price of grain slightly higher, further rise checked by increased employment of human labour on grain transport, movement encouraged is increasing. Imports, on coast considerable, by rail active. General situation improved by northern rain, still hopeful in south and east, but more rain greatly wanted there. Message ends.

Mysore Commissioners telegraphs no rain at Bangalore, slight in Coorg, rice 10½ lbs. per rupee at Bangalore, crops fading fast, insects destroying them in two districts,

* Seers per rupee. Seer = lbs. 2.

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want of rain in Coorg affecting transplanting paddy and coffee plants. In Madras very light falls in Bellary, South Arcot, Trichinopoly, Madura, Tanjore, Tinnevelly, Cuddapah, Mangalore, none elsewhere. Extensive failure inevitable unless good fall in few days. Prices have further advanced considerably throughout Madras districts, and in Calcutta rice risen 1 rupee 2 annas per maund in 10 days. In view of general reduction of stock of grain we have informed Governor Straits Settlements of high prices, probably continued large demand, and importance of encouraging immediate imports of rice, and have requested him to inform Cochin China, and Temple states that Great Indian Peninsula Railway can supply daily 800 tons grain through booking to Madras, and 400 more for Raichore, and that stocks are large. Numbers relieved:—In Bombay, 273,000 on works, 160,000 charitably; Mysore, 47,000 on works, 120,000 charitably; in Madras, 893,000 on works, 618,000 charitably.

No. 89.

Telegram, dated 24th July 1877.

From Governor of Madras to the Secretary of State.

Yours 23rd. Please expedite return of all military officers fit for duty.

Encl. in No. 103.

No. 90.

Telegram, dated July 23, 1877.

From Revenue Additional Secretary, Madras, to Revenue Additional Secretary, Simla.

Madras Government deem it their duty to report that condition of distressed districts of this Presidency is now very critical. If more rain falls within 10 days some dry crops on the ground may be saved, but even then the harvest must be an indifferent one. If no rain falls before end of month the dry crops, other than those which may be irrigable from tanks or wells, will completely fail, and result will be most disastrous. Local stocks of grain appear to be failing in many places and entirely exhausted in some; actual inability to purchase any in several parts of the country has been reported; prices higher than they have yet been and still rising, causing largely increased numbers to fall on State aid; notwithstanding careful scrutiny greatly increased expenditure will be inevitable. Government are making arrangements on assumption that the monsoon proves a failure.

Encl. in No. 103.

No. 91.

Telegram, dated July 25, 1877.

From Revenue Additional Secretary, Simla, to Revenue Additional Secretary, Madras.

The Government of India are much concerned at the disastrous state of things with which the Madras Government have to deal, as intimated in your telegram of 23rd instant. Has the suggestion made in the 5th paragraph of my letter of June 29th been acted on? The Governor-General in Council would be glad to know what are the arrangements referred to at the close of your telegram.

No. 92.

Revenue, No. 53.

From the Secretary of State for India to the Governor-General of India in Council.

India Office, London, July 26, 1877.

No. 37. Para. 1. The Despatch of your Excellency in Council, dated 11th June, No. 26, of 1877, relative to the famine in the Presidencies of Madras and Bombay and the Province of Mysore, has been considered by me in Council.

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2. With respect to the reply of the Madras Government to certain Minutes by Sir Richard Temple, on the utilization of the Public Works Department and other subjects, I am of opinion that the questions involved must now be left to the discretion of the Local Government.

3. I approve of the instructions which have been issued to the Chief Commissioner of Mysore.

4. I will await a further report on the investigations of Dr. Lewis and Dr. D. D. Cunningham, relative to the nature of the fevers which have recently been prevalent in Bombay and Madras.

I have, &c.
(Signed) SALISBURY.

No. 93.

Telegram, dated July 27, 1877.

From Governor of Bombay to the Secretary of State.

Weekly report shows further decrease in numbers on relief. People still attending to agriculture, but rainfall scanty and partial throughout Deccan, except Sholapore. Monsoon after the first break in Guzerat and Kattywar has ceased. Good rains hardly expected till monsoon improves in Concan and coast. Everywhere prices rising, but trade active and supplies large. Situation aggravated by bad accounts from Madras, Hyderabad, and Mysore.

No. 94. Encl. in No. 164.

Telegram, dated July 27, 1877.

From Governor of Bombay to Viceroy, Simla.

Replying to your Lordship's telegram I have promised the Duke of Buckingham delivery of 900 tons daily at Raichore, as Madras Railway can carry that quantity away. I have also promised to increase daily delivery as soon as Madras Government can carry away more. I have further promised Resident, Hyderabad, to deliver 300 tons daily at Shahabad terminus of Nizam's railway. I hope arrangement will be satisfactory to your Lordship, as these quantities exceed those mentioned in your telegram. I have asked Sir Andrew Clarke for 100 additional engines to be ordered from England, and rails and sleepers for 150 miles for Dhond-Munmar Chord Railway. If these be granted, your Lordship may depend on our doing everything that can be required, not only for ourselves, but for our neighbours and for Supreme Government if crisis becomes further aggravated.

No. 95. Encl. in No. 164.

Telegram, dated July 28, 1877.

From Sir A. J. Arbuthnot, Simla, to Governor of Bombay.

Your telegram of yesterday to Viceroy. Clarke is in communication with your Government regarding your application for additional engines and for rails for the Dhond and Munmar Railway. We will do what we can, but I fear neither will be in time to do much good for present famine.

No. 96.

Telegram, dated July 28, 1877.

From Viceroy to the Secretary of State.

Seriously apprehensive as to famine. I believe that unless immediate measures are taken in Madras and Mysore, a great catastrophe and enormous as well as fruitless expenditure of money are imminent. Now that another year of worse famine and still vaster expenditure are impending, it is our duty to introduce a better system, so that this immense amount of labour and money shall be devoted to great works of lasting value. An excellent example of good management has been given by Bombay.

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I feel that to cope with the dangers and difficulties present and imminent in Madras and Mysore, the highest ability and experience to be found throughout India are urgently required; and it is the duty of the Supreme Government to see that such ability and experience are applied to help the Madras Government in organising the most complete system of relief that can be arranged. I anxiously desire to maintain to the utmost the authority of the Local Government, to exercise no unnecessary interference, to give that Government every possible assistance, and to act in complete accord with it. I feel that the means now at the disposal of the Madras Government for dealing with such a crisis are insufficient. Sir A. Arbuthnot, Member in charge of the Famine Department, would forthwith go to Madras for private conference with the Duke on these matters, and with a view to form on the spot the best possible judgment. I shall also myself go to Madras accompanied, if possible, by Sir John Strachey. It is still not impossible that immediate rain might greatly improve situation, but it would be unwise to allow this hope to cause any further delay.

Encl. in No. 164.

No. 97.

Telegram, dated July 29, 1877.

From Governor of Bombay to Sir A. Arbuthnot, Simla.

Your telegram of 28th. We calculate that if rails and sleepers were available we could open Dhond-Munmar Railway for grain traffic only about 1st December, and that engines ordered now would begin to arrive in January and during February.

Encl. in No. 164.

No. 98.

Telegram, dated July 29, 1877.

From Viceroy, Simla, to his Excellency Colonel Anson, Singapore.

My telegram of 19th instant. Please inform me whether you have communicated its contents to the trade at Singapore and whether any action has been taken on it there or in Siam or Cochin-China.

Encl. in No. 164.

No. 99.

Telegram, dated July 29, 1877.

From Governor, Singapore, to Viceroy, Simla.

Have communicated with Governor Saigon, Consul-General Siam, French and Siamese Consuls here, Chambers Commerce here and Penang, and local newspapers; not yet received information of any action taken.

No. 100.

Telegram, dated 30th July 1877.

From Viceroy to the Secretary of State.

Governor of Bombay indents for 100 additional engines for Great Indian Peninsula, 10 for ghat work, and 90 goods. We submit it by early mail, with a definite recommendation of our own; meanwhile invite tenders to supply within minimum time, but reserving power to decline acceptance, and inform us how soon delivery could be given and at what monthly rate continued.

Encl. in No. 164.

No. 101.

Telegram, dated 30th July 1877.

From Viceroy, Simla, to Governor, Straits Settlements.

Kindly ascertain and communicate probable quantity of food-grains available for exportation.

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No. 102.

Encl. in No. 164.

EXTRACT from the PROCEEDINGS of the GOVERNMENT of INDIA, Financial Department, No. 2,144, dated 30th July 1877.

RESOLUTION.—The Governor-General in Council deems it important, that in all accounts of expenditure on public works undertaken by the State for the relief of distress caused by famine, a clear distinction should be maintained between the cost of materials and skilled labour, and the outlay on unskilled labour.

2. It will often be impossible to avoid some expenditure on such works for materials (the purchase and carriage of which can seldom, if ever, contribute much to the relief of the distressed population, which is the first object of the works), or for skilled labour, the employment of which might not be required immediately for relief purposes; if it is so required, the wages paid should, as a rule, be at unskilled rates only.

3. But it is the paramount duty of all authorities responsible for the expenditure on such works to reduce to a minimum the expenditure which is thus accessory to the large outlay for direct relief which, at such times, strains the resources of the State. The accounts should be so constructed as to show plainly the proportion of the whole expenditure absorbed in such accessories.

4. His Excellency in Council is accordingly pleased to decide, that whenever any public work is undertaken for purpose of famine relief, the expenditure thereon shall be classified as follows:—

(1.) For materials.

(2.) For labour paid at the rates fixed by the Government for unskilled labour upon relief works.

(3.) For labour paid, for whatever reason, at any higher rates divided into (*a*) skilled labour, (*b*) supervision of labourers, skilled and unskilled.

5. Explanation will be expected by the Supreme Government whenever the proportion of the whole expenditure which falls under headings (1) and (3) bears any substantial proportion to the whole expenditure on the work.

6. These instructions should, as far as possible, be applied retrospectively in the case of the works undertaken since the beginning of the existing famine in the Madras and Bombay Presidencies and in Mysore; and all future estimates of works to be thus undertaken should be classified in the manner thus prescribed.

ORDERED.—That this Resolution be published in the "Gazette of India" and distributed for information and guidance as follows:—

1. To the Revenue and Public Works Departments of the Government of India.
2. To the several Local Governments and Administrations.
3. To the Comptroller-General and to the several Accountants-General and Deputy Accountants-General in independent charge.

No. 103.

No. 31 of 1877.

From the GOVERNMENT OF INDIA, Department of Revenue, Agriculture, and Commerce, to the SECRETARY OF STATE FOR INDIA.

Simla, 30th July 1877.

Our telegram dated the 23rd instant will have made your Lordship aware that in view of the general decrease in the stocks of food-grains throughout India and the consequent rise of prices, we had informed the Governor of the Straits Settlements of the probability of a continued large demand for rice, and the importance of encouraging immediate importation, requesting him to communicate these facts to the Governor-General of Cochin-China and the King of Siam. A copy of our telegram to which we have not yet received a reply, is enclosed. No. 80.

2. We also now beg to report the result of inquiries which we have instituted regarding the stocks of grain available for exportation to the famine districts. In Burma the stocks are practically exhausted. The estimated stock of rice in Calcutta just now is 178,000 tons; what the stocks in the districts of Bengal may be we have not yet been informed. In the North-West Provinces and Oudh there are reported to be 220,000 tons of food-grain available for export, provided abundant rain fall soon and a good monsoon crop be produced. The estimate is, however, said to be conjectural, and it is

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added that stocks are low, and prices rising owing to alarm caused by the absence of rain. At the same time we learn that grain from Northern India is still being delivered by the East Indian Railway at Jubbulpore at the rate of 500 tons per diem. The result of accounts received from Sir Richard Temple and the Chief Commissioner of the Central Provinces is, that 100,000 tons are available in the Central Provinces, 16,000 in the hands of the railway company, and 25,000 tons in Bombay, making a total of 141,000 tons. About 200 tons per diem are being delivered in Bombay by the Bombay, Baroda, and Central India Railway. Regarding the Punjab, information has not yet been received. We are thus not in a position to state with any approach to accuracy what amount of grain will be available for the distressed districts, but it is evident that even in the event of a favourable monsoon in Northern India, regarding which some doubts may well be entertained, no amount of foreign grain which is likely to arrive will be otherwise than opportune.

No. 30. 3. The subject of the probable requirements of the famine districts of Madras, Mysore, and Bombay has also engaged our attention. We enclose some valuable proceedings of the Madras Board of Revenue regarding the additions to the food stocks of that Presidency during the period from May 1st, 1876, to April 30th, 1877. They consider that the quantity of food stocks received by their distressed districts, as far as it is possible to ascertain it, was 474,216 tons, that 1,000 persons consume, at 1½ lbs. per head, 20 tons per month, and that in the districts of Bellary, Cuddapah, and Kurnool about one-fifth of the population have been living on imported grain. The quantity of foreign grain required for these districts was some months ago estimated by Sir Richard Temple at 2,700 tons per day; recently other calculations placed the amount at 4,400 tons; and now the Madras Government have stated it to be 3,500 tons. The requirements of Mysore are given by the Chief Commissioner at 1,000 tons to be imported daily by railway alone. Those of Bombay are still uncertain owing to the holding off of the monsoon, but we trust they may prove less onerous than those of other districts. The Nizam's territory will need a considerable supply, of which the only gauge we possess at present is an arrangement, which the Bombay Government report, for the delivery of 300 tons daily at the Shahabad station of the Hyderabad Railway.

4. Whatever may, however, be eventually ascertained to be the actual requirements of the several distressed localities, it has become clear that the railway companies are, under existing arrangements, unable fully to meet them. As an illustration of this we may mention that Sir Richard Temple reports that the Great Indian Peninsula Railway are prepared to deliver 1,200 tons of grain at Raichore daily, but the Madras Government state that their railway is unable to remove more than 900 tons daily therefrom. Under these circumstances we have under consideration in the Public Works Department a project for more united action, and effectual utilisation of stock, between the several companies, which will be reported to your Lordship hereafter when fully matured.

No. 90. 5. Regarding the condition of the Madras Presidency generally, we enclose an important telegram from the Local Government, dated the 23rd instant, and stating that if more rain falls within 10 days some of the dry crops may be saved, though even then the harvest must be an indifferent one, but that if rain should hold off all unirrigated crops must completely fail. With reference to their concluding intimation that they are
No. 91. making arrangements on the assumption that the monsoon will fail, we have requested them to state what these arrangements are.

No. 76. 6. With reference to paragraph 4 of our Despatch No. 29, dated the 16th instant, we enclose copy of a letter from the Bengal Chamber of Commerce, expressing their acknowledgments for the arrangements made for giving information likely to be useful to those merchants who are interested in supplying the wants of the famine districts of
No. 53. Madras. We also enclose copy of a letter from the Government of Bombay accepting the decision regarding the appropriation of Local and Provincial Funds for famine expenditure which was reported to your Lordship in paragraph 8 of our Despatch No. 28, dated the 2nd instant.

7. The present condition of the famine districts of Bombay is described in the following telegram from Sir Richard Temple, dated the 26th instant:—

"Monsoon rain not yet resumed. Cloudy weather with general light showers still preserves young crops, reported to be withering in places but not yet lost. Cessation of rain in Guzerat causes some anxiety. * * * * *
Prices grain still rising. Importation by human labour to rural districts increases; coast imports small, by rail active, 400 tons more than last week. General situation not materially worse, but good rain much needed to reduce prices, revive credit, and lessen pressure on people."

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From a further telegram, dated the 27th instant, we learn that there has been a fall of 2 inches of rain in Sholapur, with fair local showers in parts of Ahmednagar and Satara.

8. We will now give a few particulars regarding the prospects of the season throughout British India. In British Burma the rain commenced on May 24th, three weeks later than usual, but the fall has been sufficient since, and agriculture is everywhere progressing satisfactorily. In Bengal, regarding Behar and other portions of which apprehensions were lately entertained, the rainfall has on the whole been sufficient to remove anxiety, but some individual districts have not yet received a proper supply. In Assam the rains began in March as usual, the early rice crops are nearly ready, and both food grains and tea are doing well. In the North-West Provinces and Oudh generally the drought continues, causing much anxiety and a perceptible rise in prices. The effect which a failure of crops here would have, not only on the province itself, but on the supplies for the distressed provinces to the south, would be serious in the extreme. There is, however, still time for rains to produce an average harvest. In the Punjab, little rain has fallen as yet, but the season has scarcely arrived when the fact need cause apprehension. Rajputana and Central India received at first a sufficient supply, but rain is now holding off, and much wanted in parts, though the general prospects cannot yet be termed unfavourable. The Central Provinces and Berar have received an abundant rainfall, and the crops are doing well. Regarding Bombay, Sir Richard Temple's report has been given above, to which we may add that the absence of rain in Guzerat is now attracting attention. Of the Nizam's territories the reports are most gloomy. The suspension of rainfall for a month, with high drying winds, has withered the young crops almost everywhere, and in the southern portion the population generally are said to be dependent on Government relief. The weather in Mysore and Coorg has changed somewhat for the better since the 22nd instant; showers have fallen pretty generally, and if the improvement should be maintained some portion of the newly sown ragi crop may, the Chief Commissioner believes, be saved. In Madras there has been slight rain in parts of all the distressed districts excepting apparently Nellore and Kurnool. On the whole, the season must be recognised as a most extraordinary one, in illustration of which we may mention that recent advices from Karwar describe the fishermen as still pursuing their avocation, as if it were the month of October.

The latest telegram from Madras, dated yesterday, gives the following particulars:—

Daily telegram noon July 27th:—

Madras Observatory.—·30 inches.

Salem.—Good showers over greater parts of Tripatore taluk on 24th.

Cuddapah.—Showers from 24th to 26th about 1 inch; weather cloudy; slight rain at Sidhout and Badroail.

Bellary.—Slight shower on 23rd, and seven-tenths inch at Gooty on 24th.

Trichinopoly.—Heavy showers at Perambular on 22nd; Godavery from ½ to 2½ inches on 26th; villages of Ramachendrapur taluk, on 20th, 21st, and 22nd.

Vizagapatam.—2 inches on 22nd.

Kistna.—22nd, 2 inches at Tiruvur and 1 at Krosur.

9. The number of persons relieved during the week has been as follows:—

In Madras - -	913,442	on works.
	731,267	charitably.
In Mysore - -	47,609	on works.
	137,560	charitably.
In Bombay - -	255,762	on works.
	149,072	charitably.

There have thus been very considerable increases in both Madras and Mysore, especially in the charitably relieved, but a decrease in Bombay. We take this opportunity of forwarding for your Lordship's information a revised statement of the numbers charitably relieved in the Madras Presidency since January 1st, it having been ascertained that, owing to the omission of relief camps and other items, the figures reported in the weekly telegrams from Madras were considerably under the mark. No. 31.

We have, &c.

(Signed) LYTTON.
F. P. HAINES.
A. J ARBUTHNOT.
A. CLARKE.
J. STRACHEY.
E. B. JOHNSON.
W. STOKES.

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No. 104.

Telegram, dated 31st July 1877.

From Secretary of State to Viceroy.

We strongly feel that, if your health enables you to do it, an immediate or very early visit by you to Madras, as you suggest, will be of great possible public service. It will settle many controversies, will dispose of all difficulties of jurisdiction, will enable you when you return to leave settled principles behind you, and will greatly tend to satisfy public mind.

No. 105.

Telegram, dated 31st July 1877.

From Secretary of State to Governor of Madras.

Yours 24th. Do you wish all military officers to return or only those in civil employ?

No. 106.

Telegram, dated 31st July 1877.

From Secretary of State to Governor of Bombay.

Please let me have full information as to fall of rain and monsoon.

No. 107.

Telegram, dated 31st July 1877.

From Secretary of State to Viceroy.

A considerable quantity of rice has been offered to us by Mr. Samuels, of London. I do not know whether you will require assistance in obtaining supplies, but if you do Samuels supplied us sufficiently and at a fair price during Bengal famine.

No. 108.

Telegram, dated 31st July 1877.

From Viceroy to Secretary of State.

To-day's Despatch reports progress of inquiries regarding grain supplies available for export to famine districts. In Central Provinces and Bombay, 141,000 tons. From North-West Provinces exportation depends on monsoon, but 500 tons daily still reaching Jubbulpore; from Guzerat 200 tons daily reach Bombay. Bengal stocks considerably reduced, but new rice coming into market, and trade from interior to Calcutta active at falling prices. In Burma, none. From Singapore, Anson telegraphs having informed all quarters of India's wants; probable action still unknown. Despatch also reports requirements of Madras at 3,500 tons daily; Mysore, 1,000 tons daily, and that we are arranging Public Works Department project for more effectually utilising stock of all railways for famine purposes.

Prospects of season throughout India as follows:—Burma, rain began May 24th, three weeks late, but fall sufficient; agriculture satisfactory. Bengal, some districts still want rain, but general apprehensions removed. North-West Provinces and Oudh, drought continues, causes anxiety and rise of prices, but still time for average harvest. Rajputana, Central India, rain wanted in parts; prospects fair. Assam, Central Provinces, Berar, quite satisfactory. Bombay, no rain in Gujerat, causes anxiety; heavy fall in Concan, and two inches and a half in Sholapur. Good showers in Eastern Bombay. Deccan keeps agriculture going, but prices very high. Rainfall on western coast at present very small for the season. Nizam's territory much distressed from no rain for one month, but two inches just fallen. Mysore and Coorg, rain generally not abundant; more needed to save part of young crop. Madras, fair showers in all distressed districts except Nellore and Kurnool. Cuddapah, Bellary, fall considerable, continuance may save portion of dry crops, but harvest at best indifferent.

Numbers relieved in Madras, 913,000 on works, 731,000 charitably relieved.

Mysore, 48,000 on works, 149,000 charitably relieved.

Bombay, 256,000 on works, 149,000 charitably relieved.

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No. 109.

Encl. in No. 164.

No. 2,336, dated 31st July 1877.

From A. MACKENZIE, Esq., Officiating Secretary to the Government of Bengal, Financial Department, to the ADDITIONAL SECRETARY TO THE GOVERNMENT OF INDIA.

On receipt of a telegram from his Excellency the Viceroy to the address of the Lieutenant-Governor, which reached this office on the 25th instant, intimating that the Government of India had reason to fear that the Calcutta exports of food-grain to Madras had been really far below those stated in the "Gazette of India," and requesting that inquiry might be made as to the actual stock of grain and reserve for export in Calcutta, steps were at once taken to make the necessary investigations, and I am now to submit the result for the information of his Excellency the Governor-General in Council.

2. There seems to be no doubt that the returns of exports of food-grains to coast ports furnished by the Calcutta Custom House have been throughout seriously misleading. No preventive officer is posted on board of vessels clearing for coast ports with cargoes of grain, and the Customs returns have been made up from the shipping passes, which represent merely the amount of grain that the applicants for passes think it possible they may ship, and do not at all represent the quantity of grain actually shipped. In some instances the shipping passes are returned to the Custom House with a note of short shipments or re-lands endorsed thereon, but in the majority of cases the passes are not returned, and it is assumed in the returns that the whole amount passed was shipped, though possibly this is only true of a mere fraction of that quantity.

3. In the "Monthly Commercial Guide" published by the Collector of Customs, the figures prepared from the shipping passes, less known re-lands and short shipments, are shown in the body of the book. At the close are grain tables purporting to be prepared from the manifests of the vessels cleared. Although these figures frequently do not tally with those in the body of the Guide, they are still, it is found, but little more trustworthy; for it is alleged that the manifests in the case of coast vessels are filled up very often from the Collector's daily export lists, which, as above explained, are compiled from the shipping passes. The fact seems to be that no importance has been attached hitherto, and in ordinary times, either by the Customs authorities or the trade, to the correctness of the statistics of exports to free ports. This matter was referred to in paragraph 32 of the Board's letter, No. 61 B., of the 30th January last, forwarded with this office endorsement No. 334 of the 6th February.

4. An attempt has been made to arrive at a knowledge of the actual shipments during the last few months, by procuring correct figures from the agents of the vessels, but this information has not yet been completed. Probably, however, the extent of the error in the Calcutta export returns is to be measured by the figure of the Madras imports, and in that case it is very serious indeed, as will appear from the statement annexed.

5. Orders have been given that in future a preventive officer shall visit every vessel immediately before she clears, and take extracts from the cargo-books of the actual grain shipped. If this does not secure an accurate return, more stringent measures will have to be adopted to secure correct manifesfs, in anticipation of any provisions that may be made in the revised Customs Act. But it is undesirable to throw unnecessary obstacles in the way of the trade at present, or to make unpopular changes of system at a time of pressure.

6. Turning now to the question of the stocks of Calcutta, a local inquiry with regard to rice, which is the most important item, has been made by an intelligent native officer accustomed to statistical work, who visited all the markets and entrepôts in Calcutta and its neighbourhood, and arrived at the conclusion that the stock now in hand is about 50 lakhs of maunds, of which, however, only about 10 lakhs are in the hands of dealers likely to supply an export demand. The following extracts from his report are given, as showing that the general conclusion is based on inquiry as detailed as the circumstances admitted.

"The present stock of rice amounts in round numbers to 50 lakhs of maunds, distributed as follows:—

	Mds.
At Baliaghatta and Wooltadingee - - -	9,20,000
„ Hatkhola and Coomertooly - - - -	6,50,000
„ other marts within Calcutta - - - -	9,25,000
„ Tallygunge - - - - - -	2,15,000
„ Chitlah - - - - - -	20,000
„ Kidderpore, Moonsheegunge, and other adjoining marts	5,00,000
„ Seebpore, Ramkrishtopore, Howrah, Sulkeah, Ghoosoory, Bally, &c., say - - - -	12,00,000
„ the Railway Jetties and at other outlying places, such as Gurreah, Kassipore, Baranagore, say - -	5,70,000
Total - -	50,00,000

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Baliaghatta and Wooltadingee.—"The trade of these places consists of balam rice. At Baliaghatta the trade is mostly in the hands of a dozen aruthdars, three of whom—Bunsi Buddun Puddar, Ram Kanye Puddar, and Petambur Shah—do the largest trade. The whole of the rice, as seen by me on the 24th instant, was thus distributed:—

At Baliaghatta—	Mds.
In the hands of the aruthdars (10 in number)	1,20,000
In minor aruths	1,00,000
Quantity packed in bags and awaiting delivery at the several aruths	2,00,000
In the hands of phoreahs or retail vendors	1,00,000
Total	5,20,000

At Wooltadingee—	Mds.
In the hands of mahajuns	3,10,000
In minor aruths	90,000
Total	4,00,000

Hatkhola and Coomertooly.—"Moogy rice is the chief staple of traffic here. This rice is imported from Northern Bengal, chiefly from the Dinagepore district. There are about 51 wholesale dealers in these localities, who import rice direct from the producing tracts. Moogy rice is not consumed in Calcutta, but is shipped for exportation by sea. The stocks at these marts are shown as follow:—

At Hatkhola—	Mds.
In hands of aruthdars	50,000
In bags awaiting delivery	1,50,000
Total	2,00,000

At Coomertooly—	Mds.
In the hands of aruthdars	4,45,000
In minor aruths	5,000
Total	4,50,000

Other marts within Calcutta.—"The trade here is in innumerable hands, and is entirely of a local character. We visited 21 bazars, but there are about as many more which we could not visit. The estimated figures for these are as follow:—

	Mds.
At the 21 localities visited on the 25th instant	1,20,000
For other places, say	2,80,000
Total	4,00,000

Besides this stock, we have seen a large quantity in boats on the riverside. We counted about 1,219 boats of various capacity fully laden with rice, estimated the stock to be about 5¼ lakhs of maunds.

Tallygunge.—"The bulk of the trade in this bazar is in the inferior qualities of rice, namely, amun kujlah, boro kujlah, and aus kujlah—all produced in the eastern districts, as well as in the Soonderbun tracts of the 24-Pergunnahs and Jessore.

The demand upon this market for local consumption is inconsiderable, and almost the whole of the imports, which amount annually from 25 to 30 lakhs of maunds at this place, are carried away for shipment by sea. The estimated figures for this mart are—

	Mds.
In hands of aruthdars	45,000
In boats on the khal	20,000
Rice packed in bags and awaiting delivery	1,50,000
Total	2,15,000

Chitlah Hât.—"Here the trade is in atub or table rice, imported mostly from Joynuggur and other places in the southern part of the 24-Pergunnahs. The quantity available here may be set down at 20,000 maunds.

Kidderpore and Moonshigunge.—"The bulk of the rice at these places is consigned

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from Midnapore, the 24-Pergunnahs, and Hooghly. The total stock may amount to 5 lakhs of maunds. In most of the books inspected the grand total of imports had not been struck, so that it was not possible to test their figures with those obtained by internal registration by the Government.

"The tradespeople are unanimous in the belief that the stock, whatever it may be, has been depleted to the extent of half the quantity of previous years. There was, however, one gentleman of the firm of Sumbhoonath Chowdhery, at Hatkhola, who stated that the ordinary annual stock might amount to a crore of maunds, which, no doubt, is a near approximation to the truth, and is corroborated by inquiries made some months ago.

"There are large consignments of moogy rice daily expected in Calcutta, and the fact of the aus crop already appearing in the market makes the people very hopeful of the future. The aus crop at this moment will not only help the peasantry, but will also be shipped for exportation by sea; and I was informed at Tallygunge that about 10 or 12 lakhs of maunds of aus rice are annually purchased from that market for export by sea.

"As regards the exports by sea, the demand is met from the reduced stocks in the hands of the aruthdars, as well as by daily importations; and it is a fact that new rice, as fast as it comes to Calcutta, is exported, without there being anything left to replenish the reduced stocks of Calcutta."

7. There is every reason to believe in the general accuracy of this report, but the Lieutenant-Governor has appointed a native officer to go round all the marts daily and report on the state of stocks and the briskness or otherwise of the trade. The traffic registration abstracts are also ordered to be submitted weekly instead of fortnightly, and district officers have been directed to report weekly the state of stocks in the district markets, as far as this can be ascertained, and to take note of any material fluctuations in the quantities despatched to Calcutta. This information will be duly communicated to the Government of India.

8. During April, May, and June, 39½ lakhs of maunds of rice were registered at the inland trade registration stations as *en route* to Calcutta. Besides this, a good deal comes in that is not registered; so that there can be no reasonable doubt as to the existence of a considerable stock in and about the city.

9. It is quite impossible to form any sort of accurate estimate of the amount of grain in the country. It is not collected in large warehouses and marts, but is scattered about in small quantities in every village, and nearly in every house. The brokers and boatmen, now that the rivers and creeks are open, go round and buy from house to house, and in due course the rice reaches the market. In Rungpore and Dinagepore there is a large stock, which has been awaiting the rise of the rivers, and which is now being moved into the market in Eastern Bengal. The aus crop is on the point of being reaped, and will add considerably to the stocks. There is reason to believe that in some places the people have sold too much rice for export, and have brought upon themselves an enormous rise of price of food-grain, but this is a temporary evil and applies chiefly to Chittagong and Orissa, two great places of export.

P.S.—The result of the orders to examine the cargo-books has been, in the case of the first vessel boarded, to show that in lieu of 50,020 bags entered in the Customs returns, and 48,960 bags in the manifest, only 23,663 bags were really shipped.

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No. 110. Encl. in No. 164.

COMPARATIVE STATEMENT showing the EXPORTS of RICE and PADDY from CALCUTTA BY SEA, as published by the COLLECTOR OF CUSTOMS, Calcutta, the MADRAS GOVERNMENT, and the GOVERNMENT OF INDIA, from November 1876 to June 1877.

EXPORTS FROM CALCUTTA.

MONTHS.	AS PER CALCUTTA CUSTOM HOUSE RETURNS.				AS PER MANIFESTS PUBLISHED IN THE "CALCUTTA COMMERCIAL GUIDE."				AS PER STATEMENT OF IMPORTS PUBLISHED IN THE MADRAS MONTHLY CUSTOMS STATEMENTS.				AS PER STATEMENTS OF EXPORTS PUBLISHED IN THE "GAZETTE OF INDIA."			
	To Madras Ports.	To other Coast Ports.	To Foreign Ports.	TOTAL.	To Madras Ports.	To other Coast Ports.	To Foreign Ports.	TOTAL.	To Madras Ports.	To other Coast Ports.	To Foreign Ports.	TOTAL.	To Madras Ports.	To other Coast Ports.	To Foreign Ports.	TOTAL.
1876.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.
November - - -	6,171	1,21,028	3,44,657	4,71,856	11,67,079	3,88,560	4,06,805	19,62,444	6,08,280	- -	- -	6,08,280	—	—	—	—
December - - -	27,08,725	2,08,939	5,86,932	35,04,596	15,81,466	3,47,506	4,62,428	23,91,400	6,67,219	- -	- -	6,67,219	—	—	—	—
1877.																
January - - -	24,38,476	3,48,992	12,91,916	40,79,384	24,69,144	3,11,848	8,66,346	36,47,338	15,86,796	- -	- -	15,86,796	—	—	—	—
February - - -	11,89,453	2,56,657	14,04,255	28,50,365	11,34,878	3,20,482	17,22,713	31,78,023	13,17,666	- -	- -	13,17,666	7,10,332	- -	- -	7,10,332
March - - -	15,03,075	2,20,404	7,25,801	24,49,280	10,69,168	4,04,171	13,17,278	27,90,617	7,52,573	- -	- -	7,52,573	13,04,719	- -	- -	13,04,719
April - - -	13,33,175	2,69,067	4,36,812	20,39,054	9,06,702	2,72,898	4,53,138	16,32,738	5,14,249	- -	- -	5,14,249	11,00,396	- -	- -	11,00,396
May - - - -	14,25,310	72,326	4,04,225	19,01,861	13,08,054	2,08,896	4,80,359	19,92,309	6,14,709	- -	- -	6,14,709	17,15,043	- -	- -	17,15,043
June - - -	18,71,815	2,35,601	4,26,113	25,33,529	4,18,186	99,883	4,26,423	9,44,492	4,34,209	- -	- -	4,34,209	18,52,583	- -	- -	18,52,583
Total - -	1,24,76,200	17,33,014	56,20,711	1,98,29,925	1,00,54,677	23,49,194	61,35,490	1,85,39,361	64,95,701	- -	- -	64,95,701	66,83,073	- -	- -	66,83,073
Add—Total exports of paddy during the foregoing period converted into rice at the rate of 25 seers of rice to a maund of paddy - -	78,654	51	23,028	1,01,733	52,561	5	17,923	70,489	22,669	- -	- -	22,669	61,370	- -	- -	61,370
Grand total in rice -	1,25,54,854	17,33,065	56,43,739	1,99,31,658	1,01,07,238	23,49,199	61,53,413	1,86,09,850	65,18,370	- -	- -	65,18,370	67,44,443	- -	- -	67,44,443

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No. 111.

Telegram, dated 1st August 1877.

From Governor of Bombay to Secretary of State.

Your Lordship's telegram 31st. Monsoon not failed, but continues scanty in Bombay Presidency. Sholapur, rainfall sufficient; elsewhere in Deccan, showers more or less, sometimes heavy; crops kept alive; prospects of harvest uncertain.

Rainfall generally under seven inches since beginning of monsoon; winds high; rainfall in Guzerat, Kattywar, came late; continues slight, under four inches. Rainfall, Concan, greater, but continues slight relatively. Position on coast at Bombay, rainfall heavy, nearly 40 (sic) inches, but local only, with long intervals of sunshine. Rainfall on ridge of western Ghâts sufficient, flooding streams, seasonable. Downpour monsoon in Deccan not likely till better rainfall in Concan and Canara. No danger yet in Bombay Presidency.

People engaged in agriculture. Short harvests probable, though rain may come to save much. Fair accounts from Central Provinces, Berar, Malwa.

Though some rain recently in Hyderabad, Mysore, Ceded Districts, Madras, yet accounts still indifferent. Short harvests expected at best. Lateness of monsoon in northern India aggravates situation.

Prices in Deccan touching famine rates. Though stocks large and carriage active, distress widens. Anxiety about sufficiency of engines on railway. I have made recommendations thereon, if sanctioned we can manage, even though monsoon fails.

No. 112.

Telegram, dated 2nd August 1877.

From Viceroy to Secretary of State.

As the earthworks of Dhond and Munmar line will probably be sufficiently advanced to admit of rails being laid temporarily by end of December, we are of opinion that this line should be completed as a permanent broad gauge railway in preference to any other sanctioned railway not yet commenced, except Western Rajputana line. This chord line avoids the Ghâts and cuts off 120 miles in through communication. Should famine continue into next year, and the most serious apprehensions are entertained by us and by the Local Governments on this head, the chord would be invaluable in augmenting the carrying capacity of the present rolling stock. Moreover, the chances of having to interfere with the export traffic would be diminished. Bombay Government urges that materials be got immediately. We recommend this course strongly, and that the chord shall be completed as a permanent line as soon as estimates have been prepared and sanctioned.

The following materials are required for length of railway, including sidings, of 150 miles:—Sixty-seven pound double-headed rails, same section as got out by Peninsula Railway, and now laid in Wardha Valley State Railway, with fastenings, steel rails preferred. Sleepers to be iron or wooden, or both, as most quickly obtainable; if of creosoted wood not less than 9 feet long, preferably 9 feet 6 inches long, 10 inches broad, 5 inches thick; if cast iron of same pattern as on Peninsula Railway; for same rails no objection to wrought-iron or steel sleepers, as on Oudh Railway, if obtainable quickly and suitable for double-headed rails. Arrange for only 135 miles of sleepers, as 15 miles may be got in this country. Shipments should begin to arrive in Bombay early in October, and be continued weekly so that all may reach by middle of December. Rails, fastenings, and sleepers should be shipped in due proportions for laying line on receipt at sight. Also send 12 water cranes and connexions, 20 hydrants, 100 sets of switches, 100 steel reversible crossings, of which 32 angle 5 degrees 45 minutes, 50 angle 7 degrees 45 minutes, 18 angle 10 degrees 45 minutes, 13 station signals, 25 distant signals, 3 traversers, 3 engine turntables, 3 weighbridges.

No. 113.

Telegram, dated 3rd August 1877.

From Viceroy to Secretary of State.

Supply of rails for Dhond Munmar line may possibly be facilitated by giving part at least of order to firm which supplied us with some 67 lb. rails for Wardha Valley Railway, of same section as Peninsula Company's rails. Section of rail should not be altered if steel be adopted. No objection to the additional weight. Fastenings should include chairs for wooden sleepers.

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No. 114.

Telegram, dated 3rd August 1877.

From Governor of Bombay to Secretary of State.

Monsoon not established, but better rain in Concan. Showers Deccan. Rain Guzerat, Kattywar insufficient for growing crops. Distressed districts sustained. Number of persons on relief continues decreasing. Prices very high. Trade active. Hope arises from improved accounts from Madras and Mysore, and good accounts from Central Provinces, but Hyderabad rainfall scanty. Fear of drought in Northern India is raising prices there, and impeding influx of grain towards Western and Southern India.

No. 115.

Telegram, dated 4th August 1877.

From Secretary of State to Viceroy.

Yours 30th July not understood. Are the 100 locomotives Great Indian Peninsula in addition to 40 already ordered ?

No. 116.

Telegram, dated 6th August 1877.

From Viceroy to Secretary of State.

The 100 locomotives are additional to 40 under supply. We reserve our recommendations, pending details from Bombay by post; but meanwhile kindly ascertain possibilities of supply.

No. 117.

Telegram, dated 6th August 1877.

From Viceroy to Secretary of State.

Prospect of great distress among population of Baroda State, causing great anxiety to minister. We have, therefore, in anticipation of your approval, assented to his request for construction of railway from Ahmedabad to Pahlunpore, on same gauge as Baroda line, which would work this section, and also to immediate formation of embankments as relief works. We have assented the more readily in consideration of the fact that Baroda State has contributed largely to the recent loan.

No. 118.

Telegram, dated 6th August 1877.

From Governor of Madras to Secretary of State.

Wrote to Viceroy to-day, suggesting his sending somebody of experience, in whom he would place confidence, without formal gazette appointment or delegation, to confer with us on measures taken and proposed, saying we should welcome such a mission with pleasure.

My suggestion has entire approval of my colleagues here.

Scattered but good showers continue; better reports from Malabar of weather prospects. Godavery river without freshes. Imports to Madras good; at Raichore short.

No. 119.

Telegram, dated 6th August 1877.

From Viceroy to Secretary of State.

Your telegram of 31st, about offer of grain by Samuels, of London. We remain strongly of opinion that Government should not purchase grain at present. On 29th June, by our letter to Madras Government, to which every publicity was given, we notified to trade that we did not intend to purchase grain. The trade are acting on that assurance; to adopt a different course now would destroy all confidence in the Government. Moreover, the railways are at present, and will for some time be, unable to dis-

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tribute the grain offered by private trade. Any grain we buy would, therefore, take up waggons which are wanted for private grain consignments. If we have a second famine, our difficulty will be sufficient means of transport to certain remote localities, and we may have to indent on you for light rails for tramways.

No. 120.

Telegram, dated 6th August 1877.

From Viceroy to Secretary of State.

Prospects of the season generally improved in Madras. More or less rain in all districts, heavy in Bellary and Kistna; considerable in Kurnool and Cuddapah, and parts Nellore; slight in Trichinopoly, Madura, Tinnevelly, and Salem; moderate in other districts. Standing crops saved in many parts and prospects of harvest improved, but distress still severe.

In Mysore, showers pretty general, have done some good, but prospects not materially improved.

In Coorg, moderate rain has fallen.

Regarding Bombay, Temple telegraphs as follows:—"Fair rain in eastern districts "has saved much young crops, but along western border famine area larger; monsoon "continues insufficient, better rain on Malabar coast last few days, may be considered "to indicate favourable return of monsoon; slight showers, Guzerat and Kattywar, but "anxiety regarding those parts still remain. Prices grain continue very high; imports "to rural districts by human labour continue; traffic from coast by carts active, coast "exports large, but rail increasing; general situation improved by weeks rain, but "pressure on people by high prices continues and will not be relieved till prospects of "season are reassured by better fall of monsoon rain." Message ends.

In North-West Provinces, rain has at length begun to fall in many districts and anxiety much relieved.

In Punjaub, some rain, more wanted, but condition of crops fair.

Numbers relieved in Madras, 957,000 on works, 839,000 charitably. In Mysore, 48,000 on works, 151,000 charitably. In Bombay, 248,000 on works, 149,000 charitably.

No. 121.

Telegram, dated 7th August 1877,

From Governor of Madras to Secretary of State.

Yours 21st July.

Send military officers in civil employ only.

No. 122.

Telegram, dated 7th August 1877.

From Secretary of State to Viceroy.

Pahlunpore Railway. Your telegram hardly gives us material for decision. Do you propose to construct railway as famine work at British cost? If so, why do you undertake famine charges for a Native State? I would prefer to devote our funds, which are restricted for the moment, to our own people, whom we shall with difficulty keep alive.

If Baroda and Pahlunpore propose to find money, the matters will assume a different aspect.

No. 123.

Telegram, dated 8th August 1877.

From Viceroy to Secretary of State.

The Baroda State having subscribed funds sufficient to construct the Ahmedabad Pahlunpore section of the Western Rajputana Railway on the understanding that the work had been sanctioned and would be early undertaken, has by this depleted its own treasury, and is now confronted by famine within its own territory. I have thought it but just that the money so subscribed should go towards the relief of this famine as proposed. This will have the immediate effect of retaining on their own soil the sufferers who would otherwise seek relief in British territory, and it will not interfere with Baroda's taking further steps for the relief of its subjects from its reserves or by loans from us.

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No. 124.

Revenue, No. 61.

From the SECRETARY OF STATE FOR INDIA to the GOVERNOR-GENERAL OF INDIA IN COUNCIL.

India Office, London, 9th August 1877.

No. 51. Para. 1. The Despatch of your Excellency in Council, dated 25th June, No. 27, of 1877, forwarding a complete collection of the correspondence with the Government of Madras, on the subject of supplying Sir R. Temple with certain records relative to the grant of remissions, has been considered by me in Council.

2. You have also forwarded copies of a Minute by Sir R. Temple, and two memoranda by his late secretary, Mr. Bernard, on the general subject of remissions of land revenue. These you have transmitted to the Government of Madras for consideration when the present pressure has passed away. They therefore do not demand any observation from me on the present occasion.

3. You have drawn my attention to the letter addressed to your Lordship in Council by the Government of Madras on the 10th April. A misunderstanding appears to have arisen on both sides, which gave a turn to the correspondence not wholly satisfactory. The Madras Government evidently were under an entire misapprehension as to the object with which the papers in question were asked for by Sir R. Temple, while they failed, I think, to convey to the minds of your Excellency's Government a clear conception of the nature of the scruples they entertained. As, however, your Excellency proposes to revert to the subject on a future occasion, it will not be necessary for me to enter more largely upon it now.

I have, &c.
(Signed) SALISBURY.

No. 125.

Revenue, No. 62.

From the SECRETARY OF STATE FOR INDIA to the GOVERNOR-GENERAL OF INDIA IN COUNCIL.

India Office, London, 9th August 1877.

Para. 1. The Despatch of your Excellency in Council, dated 2nd July, No. 28, of 1877, forwarding copy of a correspondence which has taken place with the Government of Madras on the subject of the rise in prices of food grains, the reduction of stocks, and the consequent pressure upon the population of the distressed districts in the Madras Presidency, has been considered by me in Council.

2. While the Despatch under reply was in transit telegrams have been received which show that the entire situation is altered for the worse in Madras, and render any detailed comment on the views stated by your Excellency in Council unnecessary.

3. I entirely concur with you in the necessity of observing the most complete publicity in making any necessary importation of supplies on Government account, but the far graver prospect which arises from the failure of the monsoon will doubtless induce your Excellency to watch with the utmost vigilance the operation of your orders restricting the purchase of grain. Due weight should be given in deciding upon the steps to be taken in this respect, to the views of the Local Government and their district officers. Your financial arrangements for meeting the charges of the famine have my concurrence.

I have, &c.
(Signed) SALISBURY.

Encl. in No. 164.

No. 126.

Telegram, dated 10th August 1877.

From BENGAL GOVERNMENT, Calcutta, to REVENUE ADDITIONAL SECRETARY, Simla.

Memorandum on stocks sent by Bayley. Special inquiries completed to-day; find about thirty-two lakhs maunds in Calcutta for all purposes; importation slackened lately owing to bores on Megna, but now brisk. Exportation lively. Freight abundant.

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No. 127.

Telegram, dated 10th August 1877.

From Governor of Madras to Secretary of State.

Imports from all sources large, but insufficient for daily wants. Have telegraphed to Government of India that if imports do not cover daily wants with margin to cover occasional interruption, great calamity by starvation appears inevitable, and asking them to state what they can do with trade. Monsoon may interrupt the traffic after eight weeks.

No. 128.

Telegram, dated 10th August 1877.

From Secretary of State to Viceroy.

Despatch leaves to-day, including following sentence:—

I entirely concur with you in the necessity of observing the most complete publicity in making any necessary importation of supplies on Government account; but the far graver prospect which arises from the failure of the monsoon will doubtless induce your Excellency to watch with the utmost vigilance the operation of your orders restricting the purchase of grain. Quotation ends.

Following in letter from merchant I mentioned:—Telegrams from Saigon and Bangkok inform me that our steamers are carrying about 1,000 tons of rice daily from those ports to China, and since 1st of January this year to 30th June more than 300,000 tons of rice have gone to China, and in another six weeks the whole of this year's crop will have been shipped to the north. End of quotation.

We feel considerable anxiety about this question of supply of grain, and understand Madras Government uneasy. Let me know what your calculations are.

No. 129.

Telegram, dated 10th August 1877.

From Governor of Bombay to Secretary of State.

Monsoon not materially improved since last telegram. Some rain Concan and South Mahratta country; showers in Deccan; hardly any rain Gujerat, Kattywar. Agriculture and crops kept going in distressed districts, but high prices telling on people.

Gradual decrease on relief continuing since beginning monsoon now arrested, and slight increase of numbers occurred, but showers falling, and hope decrease will be soon resumed.

No. 130.

Telegram, dated 11th August 1877.

From Governor of Madras to the Secretary of State for India.

Showers diminishing. Hot wind recurred. Food import does not increase. Supplies *viâ* Raichore less than half promised. Godavery river falling. No irrigation supply for Delta.

No. 131.

Encl. in No. 64.

Minute by His Excellency the Viceroy, dated Simla, 12th August 1877.

1. The summer rains of June and July have now failed, more or less, over many of the districts in Southern India where the rainfall of 1876 was lamentably deficient. The severity of the situation is increased by the scantiness of the rainfall in Western and Northern India during the past six weeks. I desire to place on record my appreciation of the probable effect of these unanticipated circumstances on the condition of the people and the prospects of the Government. In so doing, I will endeavour to indicate my general views as to some of the measures required to prepare for a second year of famine, if unhappily so terrible a calamity should overtake any large tract of Southern India.

2. The time has not come for the Government of India to review the famine operations of the year 1876–77; for the famine is still almost at its worst. But a short notice of the failure of last year's harvests, of the misfortunes thereby caused, and of the relief operations undertaken, is necessary to a proper understanding of the extreme gravity of the present situation.

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3. The summer rains (south-west monsoon) of 1876 were extremely scanty over tracts belonging to the Presidencies of Madras and Bombay, to the State of Hyderabad, and to the Province of Mysore. Over these tracts, which contain a population of about 26 millions, the summer rains yield the main rainfall of the year; they fill the irrigation tanks, and on them depends the safety of the main food crops. In the above-mentioned districts, therefore, the chief food crops of 1876 failed by reason of the shortness of the summer rains. But in the rest of the Madras country the main rainfall comes with the October rains (north-east monsoon); these rains were also very deficient, and so the irrigation tanks of the Madras districts remained dry, and the chief food crops failed. The fate of the Madras crops was thus partially in doubt until the middle of November.

4. The failure of the crops of a single year might not have caused a famine, if it had been confined to only one province, or to a few districts; for inter-communication, by railway and by road, is easy and cheap all over Southern India, and the surplus of one province would have supplied the deficiency of another. But, last year the area of failure was so vast that famine prices were inevitable; and by the month of December 1876, food-grains in the markets of Southern India were three times as dear as in ordinary years. The calamity pressed with special weight on some of the stricken districts (notably Bellary, Sholapore, parts of the Carnatic, and of Mysore), because the crops of one, or even two, preceding years, had been short. In such districts food stocks were lower than usual, and the people had less money to buy food brought from a distance. In Bengal, Burmah, Central and Northern India, the crops were happily good; food stocks were large; and there was plenty of grain to supply the stricken districts, if it could be carried thither, and if the people could afford to pay for it.

5. The policy of the Government of India, as declared after previous famines, was to give all possible facilities for the transport of grain to distressed districts; to abstain from interference with the grain trade, so long as that trade was active; to give relief wages to the destitute who would labour on useful public works; to relieve gratuitously, under trustworthy supervision, the helpless poor, when the pressure of famine became extreme; and to avert death from starvation by the employment of all means practically open to the resources of the State and the exertions of its officers; but to discharge this duty at the lowest cost compatible with the preservation of human life from wholesale destruction. In the autumn of 1876, no general instructions were issued by the Government of India for the management of serious and widespread famine; nor until November was it certain, from the reports received by the Supreme Government, that positive famine was impending in the Madras districts.

6. From the month of September 1876 a large importation of grain from Northern India and Bengal into the distressed tracts began; and this traffic rapidly increased till, in the month of December, grain was landed by sea at Madras, and was also consigned by railway, from the west, through Raichore (the westernmost limit of the Madras Railway), in much larger quantities than the railways could distribute, to the districts of the Madras Presidency and of the Mysore Province. From December up to the present time of writing, private traders have kept consigning, month by month, into the interior of the famine districts more grain than the railways from Madras, Beypore, Negapatam, and Raichore, have been able to carry. This grain has come from Bengal, Burma, the Punjab, the North-Western Provinces, Central India, and Scinde. Government has done much to facilitate the traffic; and on one occasion only have Government operations interfered with private trade, namely, when 30,000 tons of grain were bought by the Madras Government at the beginning of the famine, and were carried into the interior of the country. To this extent the railway and cart power of the country was temporarily occupied by Government to the exclusion of private trade. These proceedings of the Madras Government were disapproved by the Government of India. Prices have been very dear; but from nowhere, until the 23rd of July, have we received reports that food cannot be had in the bazaars by those who can afford to pay for it. In some of the worst districts the imported food has sufficed for the needs of about one-third of the total population. The remaining two-thirds in such districts, and a much larger proportion in the less severely afflicted tracts, have subsisted on old stocks and on the yield of the petty crops that have been harvested even during this year of famine. The importation of grain by railway into the interior has not yet exceeded an average of about—

2,200 tons a day into the interior of Madras and Mysore;

1,000 tons a day into the interior of the Bombay Presidency.

These figures do not include the large quantities of grain distributed into the interior by road or canal, from the port of Madras, and from the lesser ports on the Coromandel,

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Malabar, and Southern Mahratta coasts. There are in Central and Northern India and in Bengal large stocks of food, ready to go forward to the famine districts as soon as the railways can carry them.

7. At the outset of the famine operations there was general failure to employ the destitute poor on properly managed and useful public works. During November and December, hundreds of thousands of people sought, and obtained, relief wages on works which were not of the highest utility, and on which there was no adequate professional supervision. For this result I fear that the orders of the Government of India, enjoining the employment of the people on petty works near their homes, were in some degree responsible. In the Government Despatch, conveying instructions for Sir Richard Temple's mission to the famine country, it was mentioned that small and well-supervised local relief works might properly be opened at the beginning of a period of distress, so long as there was doubt regarding the extent of scarcity; but that, when measures of relief on a large scale became clearly necessary, great public works of a permanently useful type should be opened for the employment of relief labourers. The experience of the present famine—the friction, distress, and loss, caused by the transfer of labourers from small to large works, during February, in the Bombay Presidency—and the difficulty of moving to large useful works any considerable proportion of the relief labourers in Madras—has since convinced me of the impolicy of opening petty local relief works during the early stages of a scarcity. The orders directing the opening of small local works were modified in December, and it was subsequently laid down that relief labourers should be employed, to the utmost extent possible, on large useful works, under the direction of competent engineers. Meanwhile, before those orders had reached the local officers,

1,050,000 persons in the Madras districts,
266,000 „ „ Bombay „

were, in the beginning of January, receiving relief wages for labour that was generally inadequate, on works that were often of little value.

8. During the month of January the manner of employing relief labourers changed greatly for the better in the Bombay districts, where the Local Government utilised to the full its staff of engineers, and possessed a number of excellent irrigation schemes and other projects. During the same month Sir Richard Temple was deputed by the Government of India to visit the famine districts, and to confer with the Local Governments and their officers as to the best means of enforcing economy and system in relief operations. The admirable services rendered by Sir Richard Temple have already been acknowledged by the Government of India. It was found that vast numbers were in receipt of relief who, for a time at any rate, could support themselves. The relief wage rate was lowered, the number of petty relief works was reduced, and the supervision of relief labour was increased. In consequence of these measures the numbers of people on the relief works were, at the end of April,

In Madras districts - - - 716,000 persons.
In Mysore „ - - - 62,000 „

In Bombay, at the same time, the numbers had risen to 287,000. In Madras 11 per cent. of these labourers were employed on useful works under professional supervision. In Bombay 90 per cent. were so employed. In Mysore 47 per cent. were on useful public works; but in Mysore the numbers on relief works were, in a way that has not been explained, reduced as the pressure of the famine increased; and large sums are now being spent on infructuous alms, instead of being devoted to improving by relief labour the many irrigation works of the province.

9. It is not supposed that the relief works managed by revenue officers are absolutely useless, or are wholly unsupervised; but I fear that much of the roadwork done under revenue officers can be of no lasting value, while its cost is from twice to twenty times the ordinary rates; whereas, on the other hand, the irrigation and railway works executed under professional supervision, will be of permanent good in improving the country, and averting future famines; while some of these works (so far as imperfect information has reached the Government of India) are being executed at only from 20 to 50 per cent. above ordinary rates. At the present time of writing, the proportion of relief labourers employed under professional supervision on large works in Madras has risen, by the latest returns, to about 21 per cent. on the total number of workpeople.

10. Gratuitous relief on a large scale began early in the present famine. By the end of December there were in the receipt of gratuitous relief

110,000 persons in the Madras districts.
3,000 „ „ Bombay „
30,000 „ „ Mysore „

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These numbers were somewhat reduced in January and February; but since the end of February they have increased enormously, and have risen by the end of July to

839,000 in the Madras districts.
160,000 „ Bombay „
151,000 „ Mysore „

In Mysore the number of persons in receipt of gratuitous relief is more than three times higher than the number of the relief labourers; and it appears that in this Province relief works have not been properly managed. The persons on gratuitous relief in Madras and Bombay belong to three categories, thus—

	Children of labourers on the relief works.	Persons fed at relief houses and relief camps.	Persons relieved at their homes through village agencies.
Madras (according to the latest detailed return for the beginning of July) - -	149,000	207,000	218,000
Bombay - - - - -	83,000	66,000	

The Mysore returns do not distinguish the several classes of charitable relief. So long as relief wages are kept at subsistence rates, the small allowance of 3 pie ($\frac{3}{8}$ of a penny) per diem must be continued to the infant children of relief labourers. The inmates of relief camps and the daily recipients of food at relief houses are ordinarily fit subjects for charity, provided that able-bodied people are drafted to relief works as soon as they are strong enough to labour. Relief through village agencies may become unavoidable where famine presses severely; but its administration must be very carefully supervised, in order that the needy may be really relieved, and that there may be as little fraud as possible. In Bombay, the numbers so relieved in each district vary according to the pressure of distress and the numbers on the relief works. But the figures for Madras lead to a belief that different systems are pursued in different districts; for instance, in Kurnool, where severe distress afflicted the whole district, only 5,519 persons were receiving village relief at the beginning of July; whereas in Salem, a part only of which district was severely distressed, 88,020 persons were on village relief.

11. In regard to the main object of relief operations, viz., the saving of human life,—much, but not complete success has been attained. In some tracts relief operations began too late; at centres of population, like Madras and Bangalore, and on some of the roads leading to such centres, starvation deaths have occurred; the death rate from cholera, dysentery, and such like diseases, has greatly increased over large areas; but, on the whole, the worst evils of famine have, so far, been successfully averted over the vast tracts visited by failure of crops. According to the standard of mortality during the Orissa famine, from three to five millions of people (instead of only half a million) must have died of famine in Southern India during the year 1877, if the guaranteed railways had not existed, and if Government had incurred no outlay on relief operations. Nothing of this sort has occurred; and on this result the Governments, and the local officers, who have exerted themselves admirably, deserve the acknowledgments of the Government of India. I fear, however, it may hereafter be found that over large tracts relief operations were, for considerable periods, conducted without sufficient system, and without due regard to economy.

12. Regarding what is past, I have been obliged to say this much, because it is only after a consideration of the past that we can frame improved plans for the future. During the spring and early summer of 1877, it was hoped that the season might be favourable; that spring showers might bring forward some small extent of early food crop in June; that bountiful summer rains (south-west monsoon) would enable the people to secure a large food harvest during August and September; and that favourable October rains (north-east monsoon) would fill the irrigation tanks, and restore plenty to the districts of the Madras Presidency. The October rains are not yet due, but our spring and summer hopes have been disappointed. Had they been fulfilled, there would have been no present need for special aid from the Government of India; some millions sterling would have been spent, there would have been some waste, but in the main the great object of all this expenditure would have been obtained; the difficulty would have been over, and the Government of India would, at the proper time, have placed on record for future guidance the lessons taught by the famine of 1877.

13. But so far as the season has gone our hopes have not been fulfilled; the spring showers came not, the summer rains have, until the last week of July, been very scanty and irregular; the main food crops of part of the black soil country in the Deccan are still in great jeopardy; it is feared that the unirrigated food crops of Madras and Mysore

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must be lost, unless the good rain of the past week continues during August; the local officers report that already an unascertained, but large, proportion of these crops are dried up; the irrigation tanks of the Mysore country are still dry, and no fresh food crops, can be reaped on any large scale in Southern India before December next. If there are favourable rains in August and September, and if the October rainfall (north-east monsoon) is full, then plenty may perhaps be restored by January 1878, though the people will feel the effects of the famine for some years to come. But, even under the most favourable circumstances the pressure of famine in many districts of Madras and Mysore cannot abate greatly before January 1878; at the best, the tension in Bombay may lessen in September, and may cease altogether in December. But unless the rainfall of August and September is unusually heavy, there must be another year of famine in parts of Bombay, of the Deccan, and over a great part of Mysore; for in none* of these tracts can a heavy downpour be expected in October. A great part of Bellary and Kurnool also, where the October rains are scanty, must suffer another famine, if the summer rains are not plentiful during August and September; while if the October rains, the main rainfall of the Madras littoral, should be scanty, there must be another year of famine over a great part of the Madras Presidency.

14. Thus the present situation in Southern India is that, at the end of the season of famine, one of the great food crops of the present season is everywhere in jeopardy, and in some parts is almost irretrievably lost. Prices of food over the famine country are higher than ever, four or five times the ordinary rate; 2,500,000 people are being directly supported by State charity, of whom barely 450,000 are performing work that will have useful results. The present pressure of famine, and the present rate of expenditure, (considerably above half a million sterling per month), cannot at the best be greatly lessened before December next; whereas, if the season turns out unfavourably in any part of the famine country, that tract with its stocks already depleted must suffer from a second year of famine, more severe and more difficult than the year through which it is now passing.

15. The position in Southern India, grievous as it is, becomes much aggravated by the fact that the summer rains have hitherto been extremely scanty in the North-western Provinces and the Punjab. Vast areas of these provinces are protected by irrigation; the surplus food in stock from the bounteous harvests of the last few years is said, in the Punjab at any rate, to be very great; the autumn crop in these provinces has not yet been lost; and the seed time of the main food crop has yet to come. There is no present ground for fearing actual famine in Northern India, although I fear there may be serious scarcity and suffering in some districts; but the surplus food available for export thence to the famine country will be greatly reduced. In Bengal, Burma, and Central India, there is, according to present prospects, no reason to anticipate that the winter crops will not be full ones. But the main crops of Bengal and Burma can hardly be estimated before October at earliest.

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* The rainfall statistics for parts of Southern India are not very complete. So far as they go the meteorological returns give :—

	Average rainfall in inches during the months of		
	June to September.	October to December.	The whole year.
Poona	22½	6	31
Belgaum	36½	5	47½
Secunderabad	20¾	3	30
Bellary	11½	3	17
Bangalore	19	7¾	34½
Mean of eight districts in Mysore	17	8	—
Madras city	15	29	48½
Salem	17	8¼	34¾
Coimbatore	6	8½	21
Negapatam	9	24¼	35¼
Trichinopoly	12½	11½	29½
Madura	15	14¼	26

It seems therefore that in the Deccan, and in the ceded districts of Madras, the summer rainfall (south-west monsoon) is the mainstay of the crops; that in Mysore the heavy rain which fills the tanks and saturates the soil comes with the summer monsoon, but that the October (north-east) monsoon also gives a considerable rainfall, especially in the south of the province; and that in the districts of the Madras littoral the October monsoon yields the main rainfall of the year.

Though the north-east monsoon may be merely the rebound of the rain clouds which travel up the Bay of Bengal with the south-west winds, still we need not fear that scanty summer rains in Madras must necessarily be followed by equally scanty October rains. For the cloud currents which have this year shed plentiful summer rains over Burma and Bengal may return with the north-east winds to water the Madras littoral.

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16. The prospect in Southern India, more especially in Madras and Mysore, is therefore as serious as it could possibly be. If a second famine has to be encountered over this large portion of the Empire, the duty of saving the lives of the people, and of utilising to the utmost the vast expenditure which must be incurred, will impose on both the Supreme and Local Governments as arduous and gigantic a task as any Government could be called upon to undertake. Before entering on this task, it may be well to state shortly what are in my opinion the main principles which Government should follow on an occasion of this kind. Many of these principles were laid down by the Government of India in its instructions to Sir Richard Temple, but I think it desirable to repeat them.

17. In the first place, the Government of India, with the approval of Her Majesty's Government, and of the people of India and England, are resolved to avert death from starvation by the employment of all means practically open to the resources of the State, and to the exertions of its officers. Thus far there can be no room for doubt or difference of opinion.

18. When harvests fail in an Indian province, considerable old stocks of food are left in the hands of the landholding and mercantile classes; but these stocks are often held back from sale. Markets have therefore to be supplied with grain imported from a distance. I consider that, except under most peculiar and exceptional circumstances, the function of supplying the demand for imported grain can be best, and indeed alone discharged by private trade; and that private trade should be left to do its work in this respect with as little interference from Government as practicable. The Government and its officers should, however, give all possible information, and should give where necessary additional facilities to private trade. Early and correct information as to prices and means of carriage should be published. The carrying power of railways and canals leading into the famine tracts should be reinforced; tolls and other restraints on free intercommunication should be removed, roads into the interior should be improved and kept in order; rates of railway or other carriage might be reduced; and in cases of extreme necessity, temporary railways or tramways might be laid from main railway lines into populous tracts, whereto means of communication failed or where insufficient. These will indeed be the most useful of all works, if we have to meet another year of famine. Grain required by Government for alms to the helpless poor, or for labourers on relief works, or for any tract where supplies were deficient, should be obtained through the trade, at or near the local markets, and should not be imported from a distance by Government itself. Experience has shown that Government operations in the grain market disorganise and paralyse private trade to an extent out of all proportion to the operations themselves. Moreover where the carrying power of a country by rail, canal, or cart is limited, and is fully utilised, Government grain importations must necessarily displace a corresponding quantity of privately imported grain. My view, therefore, is that under no circumstances which are likely to occur ought the Government itself to engage in the business of importing grain. Free and abundant private trade cannot co-exist with Government importation. Absolute non-interference with the operations of private commercial enterprise must be the foundation of our present famine policy. Trade towards the famine country from Bengal and Northern and Central India is at present active; and there is every reason to believe that the Indian sources of supply are still considerable. But even if these should fail, the interference of the Government would be a ruinous error. It could only have the effect of decreasing the total amount of food available, and thus aggravating the catastrophe. I am confident that more food, whether from abroad or elsewhere, will reach Madras, if we leave private enterprise to itself, than if we paralyse it by Government competition. These remarks refer to the famine we are now dealing with. I do not of course intend to assert that famines cannot occur in which Government interference for the importation of food may not be absolutely necessary. Indeed, the Orissa famine was one of those cases.

19. Before scarcity of food deepens into famine, there is a large and increasing section of the population who are out of work, and have no means of buying food at dear rates. It is the policy of Government to employ such people on relief works; and my view is, that relief employment, at a subsistence rate of wage, should be provided on large fully supervised works, which will be of permanent benefit to the country. The advantage of large works of this kind over petty local works is twofold—firstly, the obligation to do a full day's work, at a low rate of wage, and to go some distance to work, keeps from seeking relief people who can support themselves otherwise; and, secondly, the money expended on such works bequeaths permanent benefits to the country.

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20. On this point, the following passages from Sir Richard Temple's excellent report of his recent mission to the distressed tracts of Southern India are very valuable. When discussing the lessons to be deduced from Indian famine experience, he writes—

"It seems to me that from these events we forcibly and positively learn—

"To determine beforehand, as soon as any forecast of the coming distress can be made, the large public works upon which relief labour can be employed, and upon which task-work can be exacted, or piece-work established under professional supervision;

"To notify generally, and to intimate to all concerned, especially to the Civil officers, the particular public works to which the relief labourers in each distressed district are to be drafted;

"To organise an engineering staff in readiness for undertaking vigorously these particular public works when the time for active operation shall arrive, and to prepare for devoting to this purpose all the professional establishments which can be obtained;

"To prohibit absolutely, in the beginning of the distress, the opening of petty works under Civil officers, or non-professional establishments, among the villages close to the homes of the people;

"To refuse relief to strong able-bodied persons of both sexes in any form, save employment on the large public works;

"To allow petty village works to be opened only when severe and widespread distress has declared itself at a comparatively advanced stage in any district, or part of a district, and even then to reject all, save those who cannot reasonably be expected to proceed to the large public works,—in short to reserve these petty works for the weakly, the sickly, the advanced in life, and for those who have any just claim for indulgence;

"To keep the wages on relief works at the lowest rate compatible with the health of the labourers; this being necessary, not only in the interests of economy, but also to prevent demoralisation of the people."

I do not think it would be possible to define more clearly than is done in the foregoing extracts those principles which seem to me the right ones for the organisation of famine relief works.

21. At the beginning of a famine there are some, and before the end of a famine there will be many, people who, from physical infirmity, or from social custom, or from some other reason, are unable to earn wages on relief works, and who have no means of buying food. For persons of this class the State must, when the sources of private benevolence are dry, provide gratuitous relief, if it undertakes to provide for them at all; an undertaking which, if it assumes wide dimensions, must impose upon the State operations of peculiar difficulty and delicacy. For it is the inevitable tendency of all gratuitous relief afforded by the State, if it be not supervised and restricted with the most scrupulous exactitude, to intrude injuriously on the field of relief labour, and thus demoralise large masses of the population. Such relief may be given in the shape of grants-in-aid of private charity; in the shape of cooked or uncooked food, distributed at relief centres, at camps, or poor-houses, where the recipients of relief are housed and cared for; or (if complete means of supervision exist) in the shape of money alms distributed to paupers at their homes through village agencies. One or other, often more than one, of these forms of gratuitous relief must, sooner or later, be dispensed in every famine tract. At large centres of population relief camps are useful; for the inmates are prevented from wandering about the streets, and starving for want of miscellaneous alms. On great roads and lines of traffic out-door relief centres are more suitable. Where a good indigenous village agency exists, it is advisable to register and relieve, at an early stage of a famine, the helpless paupers in their villages; so that they may be prevented from starving at home, or from wandering forth in quest of charity. But, in whatever shape gratuitous relief be given, the ordinary district organisation must be greatly strengthened to secure its due and honest administration. No other form of famine relief is more open to abuse and malversation. Every rupee spent in providing effective, trustworthy supervision is saved over and over again, not only in preventing wasteful and unnecessary expenditure, but in securing that the relief given reaches the classes and persons for whom it is intended, without being turned aside into the pockets of people who can do without State aid.

22. The principles and the policy described in the four preceding paragraphs should, in my judgment, guide the operations of Government, not only at the beginning of a famine, but throughout its continuance. Disregard of these principles must, assuredly, and indefinitely, aggravate the serious financial difficulties in which even a well-conducted campaign against a great famine involves the Government. If we have departed from

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these principles in parts of the famine-stricken country, then we should now strain every nerve to return to them as speedily as possible. Famine relief expenditure must, I fear, continue on a very large scale for some months to come. And it may be that we are on the threshhold of another, and much more terrible, year of famine. It behoves us, therefore, to lose no time in re-organising and strengthening the forces with which Government hopes to contend against famine.

23. The amount of grain carried daily into Southern India will have to be greatly increased. The present estimate, founded on the figures of the Local Governments, is that into the Madras, Mysore, and Hyderabad districts alone, from 4,500 to 5,000* tons of food may have to be carried daily; whereas 2,500 tons a day was the greatest quantity carried during the past season. I believe this full task, if it be required, can be accomplished. During the Bengal famine the railways, working from three directions, carried at times as much as 4,000 tons of food a day; and the railways into Madras and Mysore work from four different ports, besides the fifth line from the Bombay direction. No time should be lost in framing, in publishing to the trade generally, and in bringing into effect on the guaranteed railways, a scheme whereby 4,500 to 5,000 tons of food can, if consigned by the trade, be carried daily into the famine districts of Madras and Mysore. When the railway has brought the required supply of food into the country, the question will arise, whether the famine-stricken cattle can suffice for the task of distributing by cart the large quantities required in the interior of the districts. And the problem will have to be faced and decided at once, whether it will be best to lay down rough tramways for carriage of grain, or to bring the destitute poor to places near the railway lines, or to promote their emigration into other provinces.

24. Next, all the best engineering skill available in the many provinces of India should, I think, be lent to the Madras Government, so that a sufficient number of large public works may be opened in all parts of the Madras as well as of the Mysore famine country, at which the largest possible proportion of the two and half millions of people now supported by the State may be employed under proper supervision on works which will help to protect the country from future famines. The districts of Madras and Mysore are studded with irrigation tanks, and are traversed by rivers, many of which are already bridled and turned into irrigation channels. Much great work of this kind remains to be done. The projects and estimates for such works may not be everywhere ready in full detail; but it would be better for the people and for the country that the Government should accept a moderate proportion of failures in such works than not to attempt them at all. It would be wiser to lay out one million sterling on irrigation channels and reservoirs, which will store water for future needs, or on other works of lasting utility, than to spend half a million on petty works, which cannot be adequately supervised, and are of no permanent usefulness. Of the famine roads which in 1874 were undertaken in Bengal, about one-half had to be left unbridged and unfinished. These have since fallen into a condition of utter uselessness, owing to the inability of local funds to complete and maintain them. I believe that it would be highly desirable to sanction for Madras a special Chief Engineer for famine works, as was done for Bengal in 1874. Nothing is more essential to successful administration in such a crisis as the present, than the concentration of authority in the hands of a single man of energy and judgment, who shall be responsible to the head of the Local Government alone. I am satisfied that the great success which has attended the operations for the relief of the present famine in Bombay has been mainly due to the fact that this principle has been strictly acted on. The Chief Engineer, Major-General Kennedy, has been virtually responsible to no one but the Governor himself; and I believe that both the late and present Governors of Bombay have thus been able to carry out their orders with a vigour, promptitude, and success, which would otherwise have been impossible. Of course, however, this arrangement might have been as injurious as it has proved beneficial, had the officer on whom the result of it depended been deficient in experience, judgment, or energy.

25. When the employment of relief labourers shall have been thus made over to professional agency, the Civil officers will be able to give their time to organising and supervising gratuitous relief, and to saving the helpless poor from starvation.

26. The two main objects to which the best endeavours, and all the available power, of the Government of India and the Local Governments must now be directed, are,—firstly, the framing and working of a scheme whereby 4,500 to 5,000 tons of food may be carried daily into the famine country; and, secondly, the selection and commence-

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* This quantity would give subsistence to about 10,000,000 people.

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ment of large public works of lasting utility, on which all the able-bodied relief recipients of either sex and any age should at once be employed. If the rainy season, which has begun so badly, should happily end well, these special exertions on the part of the State, of the railways, and of public servants, may not be required beyond December next. If the season ends badly anywhere, then these exertions will have to be continued on behalf of such afflicted tracts until August 1878. In any case, the lives of millions, and the useful expenditure of large public funds, must depend, during the next five months, on the arrangements that may now be made. If matters are allowed to drift, there may be terrible loss of life, and there must be a wasteful expenditure of vast sums of public money, which might, under proper arrangements, bequeath great and useful works to the district wherein it is incurred.

27. The beneficial effect of money expended on well-considered and well-organised public works will be felt in the future. But for the immediate relief of the present distress, the creation and supervision of new means of transport are urgently needed. I have every reason to believe that our reserve of grain is amply sufficient to meet the increasing demand, and that, even if it runs short, we may reckon with confidence on the enterprise of private trade to supply the deficiency. But the arrangements which must now be made for distributing over large tracts of country, where no sufficient means of transport yet exist, that quantity of grain which their population requires, and the trade is able to supply, will be as difficult and delicate as they are necessary.

28. I have not included the Bombay districts in the tracts where special joint effort by the Supreme and Local Governments is at once required; because prospects in Bombay are not so bad as in the south-eastern districts, and because the management of relief works and relief operations in Bombay has, during the past season, been such as to warrant a confidence that famine there, if it comes, will be more easily met, and that relief labourers will be employed on well-organised works of permanent usefulness. I wish to take this opportunity of placing on record my opinion that the difficult task of administering famine relief in the Bombay Presidency has been at all times performed by the Local Government with a sagacity, judgment, and firmness that cannot be too highly commended. The Government of Bombay has been especially fortunate in having at its command, for the superintendence of this most arduous work, an officer of such rare intelligence and energy as Major-General Kennedy.

29. I am afraid that the situation in Mysore is, in proportion to its area and population, even more critical than in Madras. The Mysore demand for imported grain has, throughout the famine, been larger with reference to the distressed population than in the Madras Presidency. The fate of the crops now in the ground is more doubtful in parts of Mysore than anywhere else. The employment of the destitute poor on useful public works has, since April last, been quite inadequate to the occasion. At the present time the persons on gratuitous relief are three times as many as the relief labourers on public works. In Bombay the numbers on gratuitous relief are now little more than half the total of relief labourers. In Madras the total number on gratuitous relief is somewhat less than the total on works. Reports have been received from more than one Madras district that people in the last stage of distress flock over from Mysore to British relief houses for help. It would seem that Mysore relief arrangements are at present neither efficient nor sufficient. In this Province immediate steps must be taken for reorganising the relief administration.

30. As my colleagues are aware, it is my intention to visit Madras and Mysore immediately. Before starting on this journey, I have thought it desirable to place on record my reasons for undertaking it. These will be found in the foregoing general statement of the main facts of the present condition of the famine-stricken districts in Southern India. I cannot contemplate such a condition of things without the most serions anxiety, and the deepest sympathy with all those local authorities who, after prolonged and arduous exertion, are now confronted with new administrative difficulties.

31. It is unnecessary, and indeed undesirable, to discuss in the present Minute any of the particular measures which have been, or may have to be, adopted for meeting those difficulties. The teachings of experience would be as barren as they are bitter, were it impossible to derive from study, not only of the phenomena of the late famine in Bengal but also of the course of the present famine in Madras and Bombay, a clear apprehension of certain general principles of famine management. The soundness of these principles is, I think, established both by the beneficial results of their timely and intelligent application, and also by the disastrous consequences which have attended the disregard of them. I cannot doubt that they should everywhere guide our action. But it is obvious that the application of them must always be easier in some localities than in others. My object, therefore, in now proceeding to Madras is, not to urge upon the

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administrative authorities of that presidency the adoption of any system of operations devised, *á priori*, without due reference to local peculiarities, but to endeavour by frank unprejudiced personal conference with his Grace the Governor, to ascertain how far it may be practically in my power to place unreservedly at his disposal, for the furtherance of measures approved by his judgment and experience, all those resources which are commanded only by the Government of India.

32. Two or three such measures are, indeed, already foreshadowed by the Duke of Buckingham in an important and suggestive Minute, which has only just reached me. In this Minute his Grace has practically overruled the opinion of those who wanted to give extraordinary diet and comforts, costing about several rupees a month per head, to all inmates of relief camps. He has also wisely decided that none who can work shall be relieved except on public works; and he has indicated some large public works, mainly of irrigation, which will supply labour for all applicants in six districts and parts of two others.

33. Should it be found possible to develop yet further the salutary principles on which these decisions are based, by bringing the whole of that portion of the relieved population capable of work under a well organised engineering supervision, one of the great dangers with which the Madras Presidency is now threatened will have been successfully averted. But, even to carry out with complete efficiency the wise measures already announced by his Grace, the local Public Works Department will, I should think, require some addition to the strength of its staff, and some relaxation of departmental rules. The Governor of Madras has, no doubt rightly, preferred schemes for storing surplus water to projects for carrying it away; and the Madras engineers are, perhaps, the best hydraulic engineers in all India. It will be my earnest endeavour to afford the Government of Madras every encouragement and assistance in my power, for the prompt and bold development of large local public works of every useful kind. In the circumstances we have now to deal with, it is not absolutely necessary that such works should be remunerative in the ordinary sense. Since relief labour must now be employed, and employed on an enormous scale, it is, in my opinion, a matter of primary importance that it should be employed on works of the greatest possible permanent utility, even though such works be wanting in the remunerative conditions requisite to justify our sanction of them in ordinary times.

34. So long as we might reasonably hope that the worst difficulties and dangers of the Madras famine would by this time be passing over, I have purposely refrained from visiting that Presidency, lest my presence there should, however unintentionally, prove embarrassing, rather than helpful, to the efforts of the local Government.

35. But, in face of the facts recorded and reviewed in the preceding paragraphs of this Minute, I can no longer question the urgency of my own duty, and that of all concerned, under the pressure of a natural calamity greater than any which, so far as I know, has in modern times afflicted India. It is now clear that the humane efforts of the Madras Government have proved insufficient to diminish the intensity, or reduce the area, of this calamity. The distress, which appears to be increasing with frightful rapidity, must, even under the most skilful, the most economical, and the most energetic management, strain to the utmost the administrative abilities of the local Government, and the financial resources of the Empire. Therefore I cannot doubt that the Governor of Madras is entitled to receive from the Viceroy the unreserved assistance of all the technical skill and special experience this Empire can furnish, for the relief of the people and the revenue by a vigorous prosecution of the wisest measures that can be devised. In short, we are now fairly engaged in a terrible conflict with nature: our line of battle has been broken at Madras and Mysore; and it is therefore at these points we should now concentrate all our reserved force.

36. Nothing could be further from my intention than to interfere unduly with the local authorities, and the devoted officers, who have so long and zealously been combating the growth of a gigantic catastrophe. Although, up to the present moment, the result has not equalled the assiduity of their untiring efforts, yet the energy and devotion of the district officers throughout Madras, during the protracted and increasing strain upon their physical and mental faculties, cannot, I think, be too highly or gratefully appreciated. It is not to inadequate energy or intelligence, but to inadequate numbers and inadequate executive powers, that I attribute the incompleteness of their success.

37. My journey, therefore, to the famine-stricken districts of Southern India, and more especially my journey to Madras, is prompted by the hope that it may enable me to strengthen and augment the means on which his Grace the Governor of that Presidency is now dependent for the satisfactory solution of a problem as serious as any which has ever occupied the mind, or taxed the abilities, of an Indian statesman.

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38. I think that the highest expert talent procurable from any part of India should now, at once, be placed unreservedly at the disposal of the Duke of Buckingham. His Grace will be able to supplement and direct the special knowledge of experts by the large generalisations of a varied experience. Such a combination can scarcely fail to ensure ultimately to the Government of his Grace an administrative success commensurate with the magnitude of those difficulties which nothing short of the coolest judgment and most resolute firmness can now overcome.

(Signed) LYTTON.

No. 132.

Telegram, dated 13th August 1877.

From GOVERNOR OF MADRAS to SECRETARY OF STATE.

Please direct Medical Officers of Madras Army now on sick leave in Europe to return to duty, unless pronounced to be unfit for present service in the tropics.

No. 133.

Telegram, dated 14th August 1877.

From SECRETARY OF STATE to VICEROY.

Ahmedabad Pahlunpore Railway. We authorise construction on broad gauge.

No. 134.

Telegram, dated 14th August 1877.

From VICEROY to SECRETARY OF STATE.

Please order immediate compliance with entire indent for Western Rajputana line, forwarded with Despatch 182 of 1876, shipping everything to Bombay till further advised. The essential materials first wanted are rails and fastenings, sleepers, points, and crossings, locomotives, break-vans, trollies, low sided and covered waggons, for at least 100 miles of line; the continued drought in parts and difficulties of distributing food may call for temporary lines of railway, and this material will be kept in Bombay till wanted. We have no spare material at present, and therefore no reduction should be made in this indent in consequence of our wish to carry out southern section of Western Rajputana Railway on broad gauge. Your approval of our proposal on this last head is also earnestly solicited, so that earthworks may be commenced.

No. 135.

Telegram, dated 14th August 1877.

From SECRETARY OF STATE to VICEROY.

Yours July 30th. Locomotives Great Indian. If ordered immediately 12 can be delivered here December, remainder January, February, March.

I am willing to give authority if you agree. Telegraph reply.

No. 136.

Telegram, dated 14th August 1877.

From SECRETARY OF STATE to VICEROY.

Dhond Railway. As your available resources are limited, we think it better that you should decide at Madras what lines you wish to pledge yourself to.

Let me know your views after inquiry at Madras.

No. 137.

Telegram, dated 15th August 1877.

From VICEROY to SECRETARY OF STATE.

Your telegram of the 10th. We do not fully understand the object of it. Our instructions about publicity refer only to local purchases from trade. We decided at outset that private trade would import grain more efficiently than Government, and we have lately reasserted publicly our determination not to interfere.

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Do you intend to say that you think it probable that Government ought to make large import of grain? We can foresee no circumstances under which such Government interference with private trade would not be ruinous mistake. Trade towards famine country from Bengal, Central and Northern India is most active, and we see no reason to doubt that the necessary supplies will be furnished. We are convinced that far more food from abroad or elsewhere will reach Madras if we leave private enterprise to itself, and we should paralyse it by Government competition. Free trade cannot co-exist with Government importation.

Even if we anticipated failure in source of supply, we should still believe that Government interference would only decrease total amount of food available, and aggravate catastrophe. If Her Majesty's Government should think differently, we request we may receive distinct intimation of the fact. We cannot take upon ourselves any responsibility for a course which would be, in our opinion, fatal, nor can we usefully give calculations. Local estimates say from four to five thousand tons of grain must be imported daily. Grain actually ready for export on Great Indian Peninsula Railway reported to be 120,000 tons. Stocks in Bengal, Central India, Northern India, believed to be large.

No. 138.

Telegram, dated 15th August 1877.

From Viceroy to Secretary of State.

General improvement in prospects of season in Madras, Mysore, Bombay, and North-West maintained during present week. In Madras, moderate rain in Chingleput, Salem, Trichinopoly, North Arcot, Kurnool, Bellary, Nellore, and Kistna, and also in parts of Cuddapah, Madura, Tinnevelly, but light in Tanjore, South Arcot, Coimbatore. In Mysore good showers, in Coorg abundant rain.

Rain still much wanted in Punjaub, Rajputana, and western part of North-West Provinces.

Of Bombay, Temple telegraphs: message begins,—rain good in Southern Collectorates, continues partial and uncertain in rest of famine area; Concan and western tracts light, but sufficient for cultivation. Some autumn crop lost, but much still preserved by frequent light showers. Anxiety still felt regarding Guzerat and Kattywar. Prices of grain slightly easier, still very high; coast and all imports increasing, improvement of situation retarded by want of general rain; people feeling still more continued pressure of high prices. Difficulty in Bombay aggravated by state of Madras Presidency and Nizam's dominions, and by inabilities of railway to bring forward grain sufficient for great demand. Message ends.

Prices of grain continue exceedingly high throughout famine districts, but in Madras are slightly easier than in week preceding, and still are lower in every part of that presidency than in worst parts of Bombay and Mysore. The question of grain stocks and supplies continues to cause anxiety. Regarding stocks in Calcutta, previous information confirmed. Eden reports, after full conference with Calcutta firms, that trade is most active; ninety thousand tons shipping engaged, monsoon not likely to interfere much.

Condition of Mysore continues critical. We have sanctioned as relief work earthwork of railway from station to town of Bangalore.

Numbers relieved generally increasing in Madras, further increase one hundred eighty-nine thousand, making three hundred eighty-five thousand increase in last fortnight. This appears partly owing to village money dole system, of which we have requested reconsideration. In Mysore labourers on works decreasing, and charitably relieved increasing. In Bombay reverse occurring, but slight general increase in totals relieved.

In Madras 983,000 on works, 1,001,600 charitably. In Mysore 45,000 on works, 164,000 charitably. In Bombay 265,000 on works, 119,000 charitably.

No. 139.

Telegram, dated 16th August 1877.

From Viceroy to Secretary of State.

Please order immediate completion of State Railway broad gauge engines for which we have indented, and let us know by what dates first deliveries can be made in England, and at what rate continued. Also, if more of same type be now ordered, when and at what rate can deliveries be made. On receipt of this information, which we would wish to have early, we shall be better able to make final recommendation on Peninsula Company's demand for 100 engines.

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No. 140.

Telegram, dated August 16, 1877.

From Viceroy to Secretary of State.

I start to-morrow for Madras and Mysore. No change in position of affairs. I consider the present state of things frightful, and future prospects most alarming. There is everywhere the greatest zeal and devotion, but want of unity in administrative authority. My desire is to introduce into Madras a system similar to that which has worked with admirable success in Bombay, to employ the people on great works of permanent value, and, while relieving as far as possible all real distress, to apply proper tests. We have in the excellent administration of the Bombay famine a model for imitation in Madras. My plan is to induce the Duke to take into his own hands the entire management of the Famine Department, with General Kennedy as his chief executive officer. I will place at his disposal the best ability and experience that India can furnish, to act in any way that he desires in co-operation with his own officers, and will then leave him entirely unfettered by interference of Supreme Government. The strong local officers are admirable, and I desire that the Duke should give his orders to them without intervention of Council or Revenue Board. He would be his own Famine Dictator, as Lord Northbrook virtually was in 1874.

No. 141.

Encl. in No. 215.

Mr. A. C. Lyall to Colonel Burne.

My dear Colonel Burne, 16th August 1877.

I am very much afraid that the whole of Rajpootana, north and west of the Travellis, from near Deera in the extreme south-west to Ulnur in the north-west, is threatened with serious dearth. Up to this date, if rainfall of two or three inches in the middle of July be excepted, the south-west monsoon has failed altogether, and we have had much less rain than in the season of 1868, which was followed by the famine of 1868–69. The crops are already damaged widely, and what is almost more important in the great pastoral plains of the west the grass is withering up. Nevertheless, if rain falls before the end of August, and plentifully, we shall escape (the natives tell me) a famine; but if the drought continues, it will go hard with the country. Eastward and southward of the Travellis the condition of the country is not so precarious, but it is bad everywhere, though in the south-east there is less to be feared, because that part of Rajpootana usually gets some of the later rain from the Bay of Bengal.

I leave Aboo in a few days, as soon as my baggage has got ahead, and I go first to Jodhpur, then to Ajmere, where I shall take up my quarters. Unless matters mend, we shall be obliged to begin relief works soon; and it will probably be of great use to push on the Western Rajpootana Railway into Marwar. Perhaps the Public Works Department may be instructed to give very early consideration to any proposals of that nature which I may send from Ajmere.

I remain, &c.
(Signed) A. C. LYALL.

No. 142.

Encl. in No. 215.

Mr. C. A. Daniell to Mr. C. Robertson, Secretary to the Government, North-West Provinces and Oudh.

My dear Robertson, Jhansi, 16th August 1877.

I am afraid we are drifting into a condition which must very soon call for unsual measures.

Our last rain fell on the evening of the 6th, and up to last Saturday, 11th, we were just holding our own. Since then we have had nothing but sunshine, dry air, occasional high wind from the south and west, with no present appearance of any change for the better.

I have no doubt but that, if we get a reasonable fall of rain by the 25th, we may hope to pull through so far as to save a fair amount of crops sown in Jhansi, and a good amount in Lalitpur, and to admit of even some being sown during the last week of the month.

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In the Jalaun district, however, the failure is more than in this district (Jhansi), and unless we get there in Jalaun good healthy rains within a week, I doubt if there will be any kharif crop at all.

In the whole division the difficulty which presents itself now is this. The poorer class of cultivators, the ploughmen and labourers, cannot get food except with great difficulty. The Banias close their advances to the cultivators, and the labourers have no work to do.

The Banias are in the habit of feeding the poorer class of cultivators on the strength of, and on the security of, the crops in the ground; whenever there is little or no crop sown, or when the sown crop is endangered by drought, the Banias close their money bags and refuse food or its equivalent. The people are then thrown on their own resources, which are *nil* in so many cases, and it is with regard to these people I now write.

We have at present fair stocks of grain, and prices at this moment are not very high, but the prices may rise at any time, and I expect a very rapid rise at the end of eight or nine days from now, unless we have good rain.

I have just had a long talk with Porter, and have to-day heard from White and Adams.

I shall, no doubt, I fear, in a few days have to recommend that works be thrown open for employment of those who are ready to come; and of necessity the question of funds must arise.

Lalitpur for the present can get on with the Saugor road, for which we have sanction.

In Jhansi Porter recommends the Mow and Jalaun road to begin with. This is a very desirable work, cutting the worst part of the district; plans and estimates have been prepared on the rough for some time, but have not been sent on; the work has been too much for the regular division funds.

White will in due course state his projects.

I write now to you to say that I fear I shall in all probability have to come up to you very soon for a demand for money.

May I now obtain demi-official sanction to make emergent advances within certain limits should our troubles come upon us too quickly to admit of regular sanction in time to save real distress.

The case will be reported officially directly I obtain from the Deputy Commissioners their official proposals.

I have to-day issued the circular for stock of food grains to the Deputy Commissioners.

Yours sincerely,
(Signed) C. A. DANIELL.

Encl. in No. 215.

No. 143.

No. 1425, telegram, dated 16th of August 1877.

TELEGRAM from DEPUTY COMMISSIONER OF BARA BANKI, to the COMMISSIONER OF THE LUCKNOW DIVISON.

Subject.—Agricultural prospects of this district for week ending Thursday, the 16th August 1877.

Has the honour to submit a brief report on above.

2. Unless rain should fall very soon, what little now remains of kharif will be lost, and the intermediate crops of mash and moth will not be sown.

3. Cattle are reported to have died from eating joar which has dried up.

4. Very hot wind blowing. Thermometer in Court 96°.

No. 144.

No. 1540. From DEPUTY-COMMISSIONER, HARDOI, to the COMMISSIONER, SITAPUR DIVISION, 16th August 1877.

No rain except a slight shower at Hardoi. Kharif crops generally dried up. Cane much injured. Hot west wind. No prospect of rain.

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No. 145.

Encl. in No. 215.

MEMORANDUM presented to the Viceroy by his Highness the MAHARAJA of JEYPORE, dated Agra, 17th August 1877.

THE Maharaja's object in asking the favour of this interview with his Excellency the Viceroy is to acquaint his Excellency of the signs which are now visible on all sides of the fearful famine which is fast developing itself, not only in the Jeypore territory, but throughout Rajpootana, and even beyond it. The calamity, which was not at all apprehended two months ago, is now assuming so serious an aspect that his Highness has felt it necessary to wait on his Excellency for the favour of his Excellency's valuable advice as to the precautionary measures the Durbar should adopt for saving its people from the impending danger.

The following measures are now under consideration, and the Durbar will carry them out as soon as it is assured of their efficacy, and submit to Government its official reports on the subject :—

1. As the cultivating classes are already under the necessity of borrowing money and corn to save themselves from starvation, the Durbar would offer every inducement to the Bowras, or money-lenders, to lend money and corn to the subjects without hesitation. The Durbar would promise to help such money-lenders to recover the loans they may give as soon as the times are changed for the better. Should any money-lender hereafter find cause to bring any civil suit against any Raj subject, for the recovery of any such loan, the usual court-fees will be wholly remitted.

2. The Durbar would issue orders to the effect that the greatest discretion and lenity be used in realising all arrears of revenue and the dues for the current year, so that the cultivating classes may not be put to any inconvenience or difficulty.

3. At places where there may not be any Bowras, or money-lenders, the Raj would offer to lend money to the subjects from the State treasury without charging interest.

4. The agricultural classes are now keenly feeling the want of provender for the live-stock in their possession; the Raj would, therefore, pass orders that the cultivating classes be allowed to raise green vegetables on land surrounding wells, tanks, and on the sides of canals without any land-tax or dues of any kind. All pasture lands which are usually reserved for the Raj be thrown open to the agricultural and pastoral classes for grazing cattle.

5. In order to provide for day-labourers the Raj would undertake extensive irrigation works within the State and other works of public utility, and would commence working the stone quarries on an increased scale. It would also take in hand the preparation of all marble pillars and cut-stones which may hereafter be required for the Albert Hall and other public buildings proposed to be erected.

6. Preliminaries are now being arranged for opening almshouses for the aged and infirm, as well as others unable to earn their livelihood.

7. As increased distress of this kind is likely to cause increase of crimes, the Raj would add to the police force located at every station and issue special instructions for the guidance of police officers towards effectual suppression of plunder and theft.

8. All feudatories, jaghirdars, and other tenure-holders should be strictly ordered to adopt the same measures within their respective jurisdictions for relieving their own people.

9. The Durbar would pass orders to the effect that arrears of tribute and other dues should not, for the present, be demanded from these tenure-holders, so that they may be better able to take care of their people. The Durbar would also offer to lend money to such of them on indulgent terms as may already be in pecuniary difficulties.

The Maharaja would beg to submit the above measures to his Excellency the Viceroy for the benefit of his Excellency's valuable opinion as to their efficacy, and would also beg of his Excellency to favour him with further instructions which will enable the Durbar to save its subjects at this crisis. Should the rains unfortunately still hold off, the calamity will certainly become very serious, and in such a case the Durbar's exertions will scarcely be sufficient to cope with it. The Maharaja feels it his duty to inform his Excellency of the present state of affairs, and of his apprehensions for the future, before things assume a serious aspect, so that his Excellency may have sufficient time to think over the question, and that his Excellency's Government may be prepared to lend its kind assistance whenever the Durbar stand in need of it.

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Encl. in No. 215.

No. 146.

MR. H. B. WEBSTER to MR. C. ROBERTSON, Secretary to Government, North-Western Provinces and Oudh.

MY DEAR ROBERTSON, Mainpuri, 17th August 1877.

I DARESAY Sir George would like to know something about the state of this division at once; so, without waiting for the detailed information which Collectors are gathering for me, I will give you a brief statement of the present condition and prospects of the country as far as I have knowledge, personal or acquired, from interrogation of Government officers, traders, and Zemindars.

The staple food of the common people for a portion of the year (say, roughly, from October to March) consists in this part of the country of bajra, juwar, and pulses (moong, mote, and oord). Of these grains juwar alone has been sown to any extent; it has germinated and at least 50 per cent. of the crop has escaped drying up and would now yield an average produce, *if rain should fall within* 12 *or* 15 *days*. Bajra has as yet been but little sown, but in the Agra Division (I am assured on all hands) it will not be too late to sow it with every prospect of an average yield if rain fall within a fortnight; this would not be the case in Meerut, for there the seed sown now would produce little as it would surely be nipped before the perfect formation of the ear by the early frosts; there is no such danger here. The pulses cannot be sown now.

To sum up, if rain fall within the next fortnight about half of what has been sown will produce a fair return, and the sowings, which will then become possible, will yield an average amount of produce.

All the prospects of the kharif harvest then depend upon the weather of the next fortnight; at present the sky is cloudless, the wind steadily in the west, and the heat intense.

Prices are on the rise, wheat is here at 16 to 16½ seers, and at Etawah 14½ seer per rupee.

On the other side of the Jumna, in Gwalior and Bhurtpoor, the pressure of the drought is beginning to be felt by the people who are immigrating in weekly increasing numbers with their cattle in search of food and forage. These immigrations have not yet reached important dimensions; I am carefully watching them, for they will (as they were in 1868) be a source of some embarrassment to us, and they certainly will, if they increase much, render it necessary for us to open relief works earlier than we should be compelled to do for the sake of our own people alone.

If we do not get rain in abundance in September to enable the ground to be prepared and sown for the rabbi, the day labourers and the smaller class of cultivators will be in distress, and it will be necessary to find employment for them on useful public works.

My experience in the famines of 1860 and 1868 has convinced me of the immense importance of affording assistance to the labouring classes in the shape of employment on public works *early*.

The thing is to get all such persons at work on ordinary rates *before they have had time to become enfeebled and emaciated by want*. You thus (setting aside the merely humane view of the question) secure a fair day's work for a fair day's wage from your labourers employed on relief works, and avoid the pitiable waste of money which is the invariable result of letting men, reduced and weakened by insufficient nutriment, to labour for wages, even if those be fixed at the minimum which will support life. There are two works which, I am informed by the Collectors, have received administrative sanction, and for which allotments have been made, which appear eminently suited to become relief works for Etawah and Mainpuri. These are—(1), the new canal cut starting from somewhere in the Mustafabad Tahsili in the Mainpuri District, and running through the Shekoobad Tahsili down through the Etawah District to a place called Bhognipoor in Cawnpore, (in fact I believe that the projected cut is known by the name of the Bhognipoor Branch); and (2), the extension of the Lower Ganges Canal which (already partially excavated) passes through the northern and eastern parts of the Mainpuri District. I think that in the present very doubtful state of the agricultural prospects of the neighbourhood it would be *most advisable* to call on the Canal Department to have matters so arranged that it should be possible to begin operations on these two works with large gangs immediately on the first appearance of distress.

I will, as soon as possible, in consultation with district officers, prepare other projects for immediate commencement in case of need in other districts.

The two works above mentioned will, I think, suffice for the possible needs of Etawah and Mainpuri, and their nature renders them most appropriate relief works.

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I hope I have not made it appear that I am an alarmist, or that I take an unnecessarily gloomy view of affairs in thus asking that we may be prepared with relief works, matured and ready for the immediate commencement of work should the necessity arise. I do not take at all a gloomy view in reality, but I wish to be ready for the work; I fully share the hopeful frame of mind in which, I am glad to say, both land-owners and cultivators still are; they are a long way from the beginning of despair, and the predictions of the Pundits, that timely rain will fall are fortunately believed in by all classes of natives, with the result of keeping them in spirits and preventing them falling into that dull and apathetic state which was among the worst of the effects of the drought of 1868 in the cultivating classes; who (in the Saharanpore District at any rate) were so dispirited at the approach of misfortune that they would hardly make an attempt to help themselves; in many places they would not even attempt to dig kutcha wells, though the soil was in all respects suitable to them and I offered to pay the expense of the operation.

With regard to grain stocks, the detailed inquiries ordered by Government are going on, and I will report the result as soon as they are complete; but I can say that all classes of persons whom I have interrogated in the different parts of the division I have visited, are agreed that the grain stock now in the hands of the Zemindars and of the corn-dealers is very large, in spite of the heavy exportation which has been going on for some months past. *Apropos* to this subject I may mention that the dealers who had already sent grain for despatch to the railway stations are now (induced thereto by the rise of prices) removing such portions as the Company has been unable to carry up to date.

This retention of the stock of grain originally intended for exportation has caused a slight fall in prices.

The health of the people is generally good. I will write a detailed official account of matters when I return to Agra a week hence, by which time I shall have seen a very large proportion of the division and have received the reports of Collectors of the inspections they and their Assistants are now making under my orders.

Yours sincerely,
(Signed) H. B. WEBSTER.

No. 147. Encl. in No. 215.

No. 3357, telegram, dated 17th August 1877.

TELEGRAM from the DEPUTY COMMISSIONER OF LUCKNOW to the COMMISSIONER OF LUCKNOW DIVISION.

Subject.—Agricultural report for the week ending the 16th of August 1877.

There were eight-tenths of rain in Mohanlalgunj on evening of the 12th, and one inch and two-tenths in Malliabad. No rain in Tehsil Lucknow except some slight showers which could not be measured.

Prospects of kharif crops unfavourable. Hot winds blowing.

No. 148. Encl. in No. 215.

TELEGRAM from the DEPUTY COMMISSIONER, UNAO, to the COMMISSIONER OF LUCKNOW.

Hot winds. Unirrigated crops burnt up. Koari hopeless. Aghani daily more critical.

No. 149. Encl. in No. 215.

No. 1,602. From the DEPUTY COMMISSIONER, KHERI, to the COMMISSIONER, SITAPUR DIVISION. 17th August 1877.

I am unable to send you a more favourable report this week. Excepting two-tenths of an inch at the Sadar on Tuesday, about noon, and a drizzle on Tuesday night at Mohamdi, there has been no rain gauged at any of the three Tehsil rain gauges.

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There was good rain on the other side of the Chauka, at Jankinagar, in the Bhow Taluk between the Singhai and Dhaurehra Parganahs, in Tehsil Nighasen, and the police at the Dhaurehra Thana give favourable accounts of the crops in the Terai Parganahs of Dhaurehra and Firozabad. The Singhai report is not so favourable.

Lightning was observed on Sunday evening a great distance off due south, but I have been unable to learn that it reached this district.

Speaking generally, excepting in the Terai portion of the district, the prospects are gloomy. The crops in the highlands are reported to be rapidly drying up, and those in lowlands even to be suffering much from want of rain. During yesterday and to-day hot winds from the west have commenced to blow.

One curious feature in the present drought is shown in the drying up of jowar this year, which has acquired in the process a poison which is fatal to any cattle eating it. The Tahsildar of Mohamdi reports the death of 60 head of cattle from this cause, and his account of the fatality to animals eating is confirmed by Messrs. Hearsey and Carnegy, landowners in that Zillah.

No. 150.

Telegram, dated 17th August 1877.

From Governor of Bombay to Secretary of State.

Have journeyed South Mahratta country; crops excellent there, August rains being favourable, but prices continue extremely high, though trade is active. Regret no good news of rain elsewhere, and monsoon still scanty everywhere, save in Concan, where rains somewhat better. Renewed tendency decrease numbers relief works, but pressure of prices augments numbers on gratuitous relief; no trouble in any district save Kaladgi, where deficient monsoon has reduced people generally, and caused numbers on relief to rise excessively. Great anxiety and difficulty in meeting demands for carriage of grain by rail for want of enough engines. Demands of famine supplied by suspending general traffic, but engines and drivers overworked.

No. 151.

Telegram, dated 17th August 1877.

From Viceroy to Secretary of State.

Dhond Railway. Our first object in indenting for rails and sleepers is to use this line, even temporarily, for facilitating carriage of grain to famine-stricken districts of Southern India, and to guard against a possible break on the Western Ghâts, a catastrophe which would be attended at this crisis with the most disastrous results. We would press for an immediate compliance with our indent, which, in any case, need not embarrass us in any subsequent decision with reference to other railways that may be projected.

Encl. in No. 215.

No. 152.

Mr. R. M. Edwards to Mr. C. Robertson, Secretary to Government, North-western Provinces and Oudh.

My dear Robertson, Budaon, 18th August 1877.

The enclosed will show his Honour that matters are very bad here; far worse than in Bareilly. The whole way, 22 miles, from the Ramganga to this place there is scarcely a green field to be seen.

The area prepared for the kharif is sown in Tahsil Sahaswan, the same as in usual years, but in only two Tahsils and one Pargana; of a third has half the tilled area been sown; the remaining five parganas only exhibit one-ninth, one-eighth, or one-third. The unsown area is already for seed, and, if rain falls within the next eight or even ten days, an immense quantity of bajra will be put into the ground; if rain holds off beyond that period, then all becomes dark and gloomy. The scarcity, as yet, is mainly confined to the common labourers, for whom there is none of the usual field weeding. These men cannot last beyond 10 days without assistance, and neither Mahajans nor Zemindars will

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give any. The latter have all the Assamees' grain, and refuse even a chittack, rejecting all Tumussooks, promises to pay, &c. There is, I believe, ample grain in the "Kathis," but the only thing likely to make the Mahajan open his store is the fear of his having it looted —a far from improbable contingency. The people are applying to the Collector to force the Zemindars to give them grain on their bonds, and I have heard of Assamees distinctly telling their Zemindars that the grain intended for the market town should not leave the village. A party of 29 men were sent in to-day for looting grain which was being despatched; the poor emaciated fellows one and all admitted it saying they got five seers each and took it to save their own lives and those of their families. The best disposed find that their strenuous efforts to irrigate are foiled by the dry west wind, which literally burns up the soil and everything in it. The heat is terrific, but the health of all good. What is wanted is labour. I have told Sandys to start all his road repairs at once. The dry weather is opposed to good and effective work, but we must not delay until the people get too weak to work or until they are forced to support life by theft and violence.

Authority should be sent to Sandys here to commence relief-works the very hour he finds it is absolutely necessary. I have arranged what they shall be, and they can be started at 12 hours' notice. I give a list further on. Should it be necessary to have more extensive ones, I would suggest that the earth-work of the Oudh and Rohilkhund Railway continuation from Moradabad towards Bijnour be commenced. Employment will fill bellies and keep the people out of mischief and prevent their sitting idly, brooding over their future. If this is not done within the next 10 days, so far as this district is concerned, there will be serious and general crime and an overflowing jail, unless, of course, rain falls in sufficient quantity. Hitherto the little that has fallen has been so partial that only a very general tour through the entire district will procure the necessary acquaintance with the actual facts. Sandys and Robinson go out in accordance with the last Government circular received to-day. The enclosed shows the crop probable three days ago; but the cane is losing an anna every day of this west wind. All yesterday it blew very strong; to-day is almost still. I find the Pillibhit sub-division to be far better off than was anticipated, and Major Parsons is straining his canals to the uttermost. The alarm here is very general with too good reason, but I still look hopefully for rain. None of the other district reports have reached me here, and I hope they have been sent direct. I go back to Bareilly to-night, and will send fuller details on Monday. I hurry this to save the Dâk, which goes inconveniently early. I have closely examined all the Tahsildars and have interviewed many natives. One and all have the same cry: "If we get good rain within eight or at most ten days, we shall "pull through; but any longer delay will here cause a vast deal of suffering," and we must be prepared for the sad contingency.

Yours sincerely,
(Signed) R. M. EDWARDS.

Proposed works on which to employ the poorest—
Repairs to second-class roads.
Do. to third-class do.
Construction of road from Kulrala to Oosehut, 25 miles.
Consolidation of Budaon and Aounla road, 19 miles.
Increase width of this road by 10 feet (earth portions).
Construction of a bund to prevent the Ganges running up the Maharananuddi and flooding numerous villages. 10 feet at top, 80 at base. Probable cost 12,000 rupees.

These will employ a great many. Authorities at Narora have been asked if they can utilise labour.

Works will have to be simultaneously started in other districts or the poor and starving will flock into Budaon.

(Signed) R. M. EDWARDS.

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For what Period.	Weather and Rain-fall.	Agricultural Operations and Prospects.	Prices.	Health.	General Conditions and Prospects of People.
		BUDAON.	s. c.		
From 10th August to 18th inclusive.	Hot and strong wind from west blowing throughout district. Rain-fall— Budaon, 14th Aug. ·1 Bisauli - - ·3 No rain elsewhere.	The showers on 14th allowed of some sowing for kharif and ploughing for rabbi. All the young crops much injured by the hot wind and irrigation almost abandoned as useless. Almost all kharif area tilled, but less than one-half sown.	Wheat - 16 3 Barley - 21 9 Rice, first - 9 9½ Do., second 12 0 Gram - - 17 6 Urd - - 15 9½ Moong - 15 0 Urhur - 16 12½ Prices falling fast. Wheat, 13½ seers on 18th.	Good -	Prospects very gloomy. Agricultural labourers already in great straits as there is no field-weeding or other employment for them. Loads of wood or grass brought from the jungle, which usually fetch 2 annas per load, are sold for 2 pice. Zemindars and Mahajans storing their grain expecting higher prices, and will not assist Assamees. Extensive or wealthy Zemindars are scarcely known in district. Last rabbi was excellent and plenty of grain said to be in district. Crime increasing.
		MORADABAD.			
Up to 17th August, by telegram.	Very damaging west wind prevailed during week, injuring all crops, especially sugar and checking ploughing and spring crops.	Ploughing for rabbi partial. Prospects bad.	Prices rising fast -	Do. -	People said to be losing heart.
		BIJNOUR.			
Up to and including August 14th. No telegraph station.	No rain. Wind mostly westerly during week, strong and very hot, drying up the young crop and sugar-cane. Prospects more discouraging weekly.	Prospects very gloomy	Prices rising - - Wheat has risen to 17*s.* 7*c.* from 19 seers Government weight.	Do. -	The Collector is in the interior of the district making personal inquiries. Nothing good to report, but no direct intelligence from Collector of very late date.
		SHAHJEHANPUR.			
By letter and telegraph. Up to 18th August.	No rain: violent hot winds from west.	The general rain-fall throughout the district since 1st July has been 2·9. The average for the same period for the last five years has been 19·8. Save where irrigation is plentiful, sugar and cotton crops are in an almost hopeless state. Other crops scarcely exist, save in Tahsil Pamayan, which has had 3·6 of rain.	On 13th wheat fell to 15 seers, but has since been selling at 16*s.* 7*c.* s. c. Barley - 23 to 24 Gram - 20 to 21 Rice - - 8 to 12	Do. -	The area usually cultivated for the kharif is about 327,421 acres; area tilled this year, 222,789; area sown, 138,608; area in which the seed has germinated, 112,617. Prospects best in Tahsils Pamayan and Jelalabad; worst in Shahjehanpur and Tilhur.
		BAREILLY.			
Up to 19th August	No rain - - Strong westerly winds throughout week, burning up the sugar-cane and young crops.	The drying properties after continuous high west wind defeats all efforts at common irrigation.	Prices rising - - Wheat, 13 seers; Bareilly, weight 102.	Very good.	Collector says there is nothing new to report. Prospects are becoming worse daily.

(Signed) R. M. EDWARDS,
Commissioner.

Encl. in No. 215.

No. 153.

MR. C. P. CARMICHAEL to MR. C. ROBERTSON, Secretary to North-Western Provinces and Oudh.

MY DEAR ROBERTSON, Benares, 18th August 1877.

LOOKING to the fact that we have had no rain here since Saturday week, and that for the last four days a hot and strong westerly wind has been blowing, I had hardly hoped to have been able to send to you anything like a cheerful report. But Basti excepted (for the western portion of which district I have great fears), we are

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as yet safe. But I cannot say what may not happen if another week of this hot wind continues.

Benares.—Church writes:—"Notwithstanding that no rain has fallen since my last report, and that at the present moment a high westerly wind prevails, I see no reason at present to apprehend any serious failure of the kharif provided we have rain in the next few days. Travelling down the rail the other day to Phulpur (this is in the direction of Jaunpur), I was surprised at the fine condition of the crops, especially cane and flax. The rice also looked green and good, but it is of course likely to suffer unless timely rain should come."

Mirzapur.—Lumsden writes:—"Rain-fall from 7th to 13th August was as follows; Mirzapur nine notches, Chunar *nil*, at Robertsganj 11 notches, at Chakia 46 notches, at Kourh 10 notches. More rain required for the kharif crops, especially in the Chunar Tahsil. If it keeps off much longer, prospects will be as bad as before.

Azamgarh.—Gardener writes:—"The early kharif crops are suffering from want of rain. The planting out of rice is being effected wherever irrigation is practicable, but the full area will in no case be planted. Fear is entertained that the sugar cane will be deteriorated. Rain anxiously awaited."

Ghazipur.—Barstow gives a very full report. The pith of it is that prospects are good in those Tahsils which border on the Ganges, or more properly speaking, in the low lands of those Tahsils. Tahsils Balia, Kooruntadih, Saidapur, and Zamaniah are all good. Ghazipur not so, and Rasrah decidedly bad; the rice crop there as also the cane being seriously injured. Prices of grain, however, stationary; barley being 28 seers and wheat 18 seers for the rupee. Urd 21 seers, urhur 32, bajara 18, rice 14. The abundance of rain they have had in Patna adjoining evidently keeps down the prices. I fear the kharif in the Rasrah Tahsil is all but gone.

Gorakhpur.—Moens writes:—"After I had written my last report we had fair showers of rain on the 8th and 9th, since then to 15th great heat and bright sun which did much damage to the young crops. To-day (15th, date of his report) we are having a heavy shower. It is the first really heavy monsoon like rain we have had, and it will do much good. The crops to the east and north of the district looking very well on the whole. To the west and south, where there has been but little rain, the crops are poor and backward." He concludes by saying that "on the whole to-day's rain, if general, will make things look brighter than they did last week."

Basti.—In a demi-official dated yesterday (the 17th) from Markham, he writes:—"Nothing could possibly look worse than at present. Yesterday and to-day we have hot westerly winds. To-day it is like the *loo* of April. Half a tornado, and loaded with dust." In his official report simultaneously received, he writes:—"To the west the crops are in a very bad way, and in parts the people have begun to graze their cattle on the rice. Everywhere, except in Bansi, and in parts of Khalilabad, the general outlook is distinctly worse than at date of last report. In Bansi things are improved and to the north-east of Khalilabad a recent copious shower has revived the face of the country. The vitality of the crops is proverbial, and I have reason to think that if good rain were even now to set in, taking one tract with another, a good eight-anna crop would still be realised. Prices stationary, and health of district good."

The above will show you that in Benares we are as yet safe. In Mirzapur the same, the Chunar Tahsil excepted, where rain is much wanted. Ghazipur good, all excepted the Rusrah Tahsil. Azamgarh critical and shaking for want of rain. Gorakhpur a great improvement on last week's report; and Basti fairly good to north and east, bad to west. All will depend on the next ten days, or say fortnight at the outside. If rain comes by then, the kharif crop is saved, if not lost, and our thoughts must be turned then to wishing for late rains for the sowing of the rabbi. I go over to Mirzapur on Wednesday, and shall stay there for three or four days and confer with Lumsden and his Tahsildars. After my return here I shall leave for Ghazipur, Azamgarh, Gorakhpur, and Basti. I can hardly expect to get back here much before the 15th proximo unless rain sets in, when I shall terminate my travels abruptly. The heat is something fearful.

Yours sincerely,
(Signed) C. P. CARMICHAEL.

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Encl. in No. 215.

No. 154.

Telegram, dated 18th August 1877.

TELEGRAM from the COMMISSIONER, LUCKNOW, to the SECRETARY TO GOVERNMENT, North-western Provinces.

No rain of consequence except in some Lucknow villages where about one inch fell. Hot winds. Prospects daily worse.

Encl. in No. 215.

No. 155.

From the DEPUTY COMMISSIONER, SITAPUR, to the COMMISSIONER, SITAPUR DIVISION 18th August 1877.

No rain. For the last four days a strong west wind drying up everything.

Encl. in No. 215.

No. 156.

No. 2597, dated Naini Tal, the 18th August 1877.

COMMISSIONER, SITAPUR DIVISION, to the SECRETARY TO GOVERNMENT, North-Western Provinces and Oudh.

Report of agricultural prospects in the Sitapur Division.

Submits for the information of his Honour the Lieutenant-Governor and Chief Commissioner, copies of the Deputy Commissioner's Reports detailed in the margin.

D. C. H.'s No. 1,540, dated 16th August 1877.
D. C. K.'s „ 1,602, „ 17th „ „
D. C. S.'s „ „ 18th „ „

Encl. in No. 215.

No. 157.

MR. A. FRASER to all COLLECTORS and DEPUTY COMMISSIONERS, North-Western Provinces and Oudh.

EXTRACT from the PROCEEDINGS of the GOVERNMENT, North-Western Provinces and Oudh, Nos. 372—418 A.C., dated Naini Tal, the 18th August 1877.

Read the following:—

To all Collectors and Deputy Commissioners, North-Western Provinces and Oudh.

DEAR SIR,

IT is within the bounds of possibility that the want of rain this year may result in at any rate a partial failure of the kharif crop, and the Lieutenant-Governor is of opinion that, although there is no immediate danger of famine, or even of scarcity, yet it would be advisable to be prepared (in the event of the continued dry weather resulting in the destruction of the crops) with matured projects to meet the requirements of relief to a small or large extent.

2. I am, however, to impress upon you that the preparation of these projects is only a precautionary measure to meet a contingency that the Lieutenant-Governor trusts is only remotely possible, and as it would be inadvisable that a mistaken impression should get abroad that his Honour considers a condition of scarcity to be imminent, I am to request that you will consider this communication as confidential, and prepare, with the aid of your District Engineer, the necessary projects to meet all possible contingencies, without making public the views of Government.

3. I am to refer you to the annexed extracts* from Chapter XIIIA. of the Public Works Code, paragraphs 36 and 37, and to observe that the object of the Government is, in adopting the gradual scale of work therein enjoined, to start relief by executing works of use to the State at ordinary rates, with full task of labour.

4. Your project should take the form of separate lists of works under the following heads, and should be progressive, being graduated to meet the requirements of your district in stages of less or greater distress.

* 36. It is important that the means of obtaining work and food should be brought within the reach of the people of a distressed district as early as possible, and that the offer of relief should not be delayed so long as to lead to their strength being destroyed by continued want before they are provided with employment. All danger of creating any objectionable interference with the natural demand for labour on these occasions is at once rendered impossible by properly limiting the wages offered on relief-works. If the rate is fixed so low as merely to give a bare subsistence, it is certain that no one will seek employment on the relief-works who can do better for himself in any other occupation. When a real pressure begins, the real sufferers will be led to the works, and, as soon as that pressure is taken off, they will leave them.

37. The distinction between employment in time of famine on ordinary works, where a full rate of wages is given, and a full quantity of work is exacted in return,—and on relief-works, where a bare subsistence is given for whatever work the labourer can perform,—must be distinctly remembered. The two classes of works may, with perfect propriety, be going on at the same time, not only without interference, but with mutual advantage. The relief-house at which support is given without labour, the relief works at which a subsistence is given for a minimum of labour, and the ordinary works where ordinary wages can be earned for the full day's work, provide for the labouring population a gradation between the most complete pauperism and misery, and the healthy state of self-supporting labour.

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5. The works that should first engage your attention should be those connected with repairs to communication, and might be enumerated under the heading:—

A. Repairs—

I.—Repairs to first-class roads.

These would comprise the collection of a supply of metal sufficient for the repair of the road for the next three or four years, and the thorough repairs to the patris or unmetalled portions.

II.—Raising and improving second-class roads, so as to place them in a condition to require but trifling repairs for some years to come.

III.—Improving third and fourth class roads.

IV.—Improving approaches to boat bridges, and ferries.

V.—Repairs to canals, tanks, bunds, &c.

VI.—Repairs to drainage works.

6. In the event, however, of these projects not affording sufficient work for the needy population, and of the necessity arising for instituting relief works at reduced rates, so as to meet the principles laid down in the paragraphs of the Code above quoted, it would be necessary to turn to original works as a source of relief, and I am therefore to request that you will supplement the repairs list with others, under the head of—

B. Original Works—which should comprise—

I.—Works for which projects, which have received the sanction of Government in either this Department or in the Irrigation branch, exist, and which have been postponed for want of funds.

II.—Works which have received the administrative sanction of Government in the General or in the Public Works Department, in either of its branches.

III.—Works that have not received the sanction of Government, but for which projects have been more or less considered and matured by you.

IV.—Works which have as yet been unconsidered, but which in your opinion would at once form an efficient mode of affording relief, and be subsequently of use to the district, and for which you could prepare projects without additional agency.

V.—Works, the preparation of projects for which would require your obtaining additional assistance from the department.

N.B.—The list for repairs and original works should be separate under each head in the Buildings and Roads, and Irrigation branches, and the list of projects under head V. might be submitted hereafter should the necessity of greater relief become obvious.

7. Looking forward even to the worst contingency, viz., the absence of rain in September, resulting in the loss of the rabi crops. It may be presumed, considering the excellence of the cold weather crops of 1876-77, that there are large stocks of grain in the country; and that consequently the increase of distress in your district could only be very gradual; and it is with a view to meeting the possible gradually increasing demands for relief, without incurring unnecessary expenditure to the State, that you have been requested to arrange your proposals on a progressive system, so that the requirements of the district, so far as relief works are concerned, may be met at every possible stage.

8. The form that accompanies this letter will enable you to fill up a statement that will furnish all the necessary information to enable Government, in the event of the initiation of relief works becoming necessary, to instruct you as to the way in which relief can be afforded with the greatest advantage to the inhabitants of your district, combined with a minimum of direct loss to the State; and in view to this desirable end, I am directed to impress upon you the necessity for giving the preparation of this return your most serious attention.

9. Having completed your return, you will submit it to the Commissioner of your division, who will be instructed to forward it (with such remarks as his experience and knowledge of your district may dictate) to Government; and it is hoped that armed with ample data, such as will be furnished by these reports (if carefully prepared), his Honour will be in a position to meet most satisfactorily the requirements of your district, should scarcity or even famine render the direct intervention of Government necessary for its relief.

10. I am directed to reiterate the assurance that Sir George Cooper sees no immediate cause for alarm, and to impress upon you the necessity for avoiding any action that might lead to the impression that scarcity in any of the districts of the North-

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Western Provinces and Oudh was in any way anticipated by the Government; but, I am finally to request that you will carefully bear in mind the principles for relief in time of famine laid down in Chapter XIIIA. of the Public Works Code.

Yours, &c.
(Signed) ALEX. FRASER.

No. 158.

Telegram, dated 18th August 1877.

From Governor of Madras to Secretary of State.

After fullest consideration of railway famine requirements, possible aid from India, and consultation with railway officials, we have decided that 20 locomotives, 600 high-sided waggons, and 80 break-vans are urgently and immediately required for Madras Railway. Railway officers' estimate much greater. Locomotives should be Trevethick's design, not similar to new Kitson's; waggons carrying 12 tons each, break-vans weighing 10 tons. Please sanction and communicate to Directors for immediate execution and despatch.

No. 159.

Telegram, dated 19th August 1877.

From Secretary of State to Viceroy.

(Replying to telegram from Viceroy, dated 15th August 1877, p. 117.)

I do not understand your objection to making calculations. Situation is one requiring extreme vigilance, and Government should possess all attainable information which can enable it to forecast probable necessities of people and available sources of supply. The importation of grain into any district will only become incumbent on Government where it appears probable that trade will fail to provide food necessary for keeping population alive, and where Government is able to supply the deficiency. Except in this exigency, I admit that competition with private trade would discourage it, and therefore would be dangerous. Such exigency is not probable because obstacle which will hinder private trade will usually hinder Government also, but in an utterly abnormal calamity such exigency is not impossible, and should not be excluded from your consideration. It will be well to ascertain how far probable arrivals of grain correspond with estimated need.

Encl. in No. 215.

No. 160.

Mr. R. M. Edwards to Mr. C. Robertson, Secretary to Government, North-Western Provinces and Oudh.

My dear Robertson, Bareilly, 19th August 1877.

I enclose the District Weather and Agricultural Report. Alas! it is in every respect gloomy and unsatisfactory. I only got back from Budaon at midnight, and am off again to-morrow night to Shahjehanpur. Heat terrific, but wind back to east; sky as clear as ever, so it will probably be west again in an hour or two.

No Collectors have yet applied for relief works, so I trust the state of things I yesterday reported from Budaon is not universal, and the big Zemindars and Talukdars of the two western districts will, I expect, listen to advice and counsel, and enable the tenants to tide over the difficulties.

In haste, &c.
(Signed) R. M. EDWARDS.

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PROSPECTS OF SEASON.

Tahsil.	Weeks ending											Total.	Area ploughed for Kharif compared with that usually ploughed.	Area sown.	State of Crops.					
	4th June 1877.	11th June 1877.	18th June 1877.	25th June 1877.	2nd July 1877.	9th July 1877.	16th July 1877.	23rd July 1877.	30th July 1877.	6th Aug. 1877.	13th Aug. 1877.				Rice.	Maize.	Cane.	Cotton.	Indigo.	—
															As.	As.	As.	As.	As.	
Budson	—	·5	—	—	2·0	·2	—	·4	—	1·9	—	5·0	Budson, all - Ujhani, all -	One-half Do.	4	6	12	10	8	Bajra, Joar, Chari, Urd, Mung Mote, Lobia, Til, about one-fourth of area sown and still flourishing.
Bisauli	·8	1·5	—	—	6·1	—	2·4	·4	—	—	—	11·2	Islamnagar, all Bisauli, all - Sataai, all -	Do. Do. Do.	8	—	12	10	10	Bajra, &c., one-half of area sown and uninjured as yet.
Gunnaur	·1	—	—	—	1·7	·1	·2	—	—	·2	—	2·3	Rajpura, all - Asadpur, all -	One-quarter Do.	5	2	5	5	—	Bajra, &c., none sown; Chari, 5 As. crop.
Sahaswan	·3	·3	—	—	5·9	—	·3	·1	—	·2	—	7·6	Sahaswan, two-thirds. Kot, all - -	One-third One-half	8	8	8	12	8	Bajra, &c., about one-fourth of area sown and 14 As. crop.
Dataganj	—	1·0	—	—	2·4	—	·4	·3	—	—	—	4·1	Salempur, all - Uschat, all -	One-eighth One-fourth	4	—	8	10	8	Bajra, &c., one-fourth area sown and crops flourishing.

(Signed) M. SANDYS, Collector.

No. 161.

Telegram, dated 20th August 1877.

From SECRETARY OF STATE to PRESIDENT, Simla.

Broad-gauge locomotives. 20 under Railway Letter 14 of 1877; delivery, one in November, one a week afterwards, possibly faster. 20 under letter 87 of 1877; three probably in January, three a week afterwards for remainder of indent and for any addition, if orders given immediately.

No. 162.

Telegram, dated Danowle, 20th August 1877.

From VICEROY to SECRETARY OF STATE.

In the north-west no rain or prospect of rain. Throughout the whole of Rajpootana serious scarcity now imminent; crops widely damaged and grass withering. Famine impending in Gwalior. In Hyderabad, resources of State, after expenditure of over 12 lakhs, said to be nearly exhausted, and scarcity increasing, as also in Baroda. Native States beginning to stop their export trade; if dearth continues, as seems likely, the condition of the northern provinces may affect the whole of India more seriously even than the present severe famine in Madras, where, for this reason, it is more than ever necessary to prevent wasteful expenditure if possible.

No. 163.

Telegram, dated 20th August 1877.

From the SECRETARY OF STATE to the GOVERNOR OF MADRAS.

The Viceroy has communicated to me proposals for administering famine business in Madras, which appear to me wise. The essential point of it is that the management shall be centred entirely in your hands, your staff being strengthened by Secretaries who have had famine experience elsewhere. It will relieve me of much anxiety if you can see your way to agree. We have complete confidence in you, but some of your administrative machinery is circuitous and cumbersome. Such a calamity should be dealt with by your undivided authority free from any impediments of customary routine.

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No. 164.

No. 34 of 1877.

From the GOVERNMENT OF INDIA, Department of Revenue, Agriculture, and Commerce, to the SECRETARY OF STATE FOR INDIA.

Simla, 20th August 1877.

No. 131.

Enclosures Nos. 83, 94–5, 97–9, 101–2, 109, 126.

We have the honour to report that in view of the renewed failure of the south-west monsoon in many quarters, and of the circumstances set forth in the accompanying Minute by his Excellency the Viceroy, it has been thought advisable that his Excellency, accompanied by Sir Alexander Arbuthnot, should visit Poona, Bangalore, and Madras for the purpose of conferring with the local Governments and the Chief Commissioner of Mysore on the condition and prospects of the three Provinces, and on the measures necessary to enable them to deal effectively with the situation. We trust that this determination will meet with your Lordship's approval.

We have, &c.

(Signed) E. C. BAYLEY.
F. P. HAINES.
A. CLARKE.
J. STRACHEY.
E. B. JOHNSON.
W. STOKES.

No. 165.

Telegram, dated 21st August 1877.

From VICEROY to SECRETARY OF STATE.

Your telegram 19th, grain calculations; will reply from Poona. Our great deficiency is not in grain, but the means of carrying and distributing it. At Jubbulpore, which I have just left, 24,000 tons of grain waiting to go south, and equal quantity ready to replace it, but railway can only carry 1,000 tons weekly.

Merchants are beginning to send their grain northwards to Agra, in consequence of increased scarcity in north-west and deficiency in crops.

Government is of course collecting information and making calculations, but my reasons for not sending them were, first, they cannot be implicitly relied on, second, they cannot influence principles of our policy. Government grain useless unless rapidly distributed, and in that case mischievous, because it would monopolise means of transport already of insufficient strength. Trade will import grain when necessary and know when and how to do this better than Government. Even therefore in event you refer to we should not import, but have authorised local authorities to purchase by public tender for supply of any places not reached by trade. I fear even this is liable to dangerous abuse.

Government of Madras has been considering supply of betel nut and tobacco for paupers, and has sanctioned indents for condensed Anglo-Swiss milk for infants, has also raised allowance to children under seven from 3 to 6 pice. On arrival at Poona I shall meet railway authorities to discuss remedy of alleged defects in railway affairs.

No. 166.

Telegram, dated 21st August 1877.

From SECRETARY OF STATE to VICEROY.

A firm offer to ship to Bombay or Madras, in about eight weeks, 300 miles light tramway, four feet eight and a half gauge; 60 engines; 1,800 waggons, carrying each four tons; to lay tramway, erect engines and waggons, at cost inclusive of 1,350*l.* per mile.

Further undertake working of lines at price to be agreed for every ton carried, and to supply engineers and drivers. Would accept in payment Indian Exchequer bonds, carrying four per cent. interest. Government to supply sleepers, and pay carriage from Indian port to interior.

What reply shall I make?

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No. 167.

Telegram, dated 21st August 1877.

From Secretary of State to Viceroy.

Suggested traction engines may be of service.

The steam sapper is said to be most approved of, owing to light weight, simplicity, and drawing power. Weight when working, 116 cwts. 3 qrs., width of track, 5 feet 9 inches; consumes 49 pounds of coal per hour on ordinary roads, and 35 to 48 gallons of water. It can draw on roads, with slopes not exceeding 1 in 11, 10 tons. Carriages for grain would weigh 2 tons each, and carry 3 tons. Speed on fair roads, 2½ to 3 miles an hour.

No. 168.

Telegram, dated Callian, 21st August 1877.

From Viceroy to Secretary of State.

Yours of 19th. I thank your Lordship for supporting our view that, save under exigencies of which in our opinion there is not the slightest probability, Government should not engage in importing grain. In our telegram about Saigon offer, we stated that existing private importation occupied all available means of internal transport; this is still the case, our object is to increase these means for special local exigencies. Where supply is short, Collectors are authorised to obtain grain through trade in ports of three districts, this is already doing.

Our information and calculations of probable arrival of private grain are,—total demand for Madras and Mysore, 4,500 tons daily; average daily despatches of rice from Bengal to Madras ports during past two weeks, 3,050 tons per diem; steam freight from Bengal for additional 90,000 tons, reported by Eden to be taken up. Burmah despatches only 170 tons daily, 300 tons daily despatched inland from Beypore, where increase expected. Great Indian Peninsula delivers 800 tons a day at Raichore for Madras district, some part of 750 tons delivered daily at southern port reaches Western Mysore and Bellary; excluding this last, calculations give altogether 4,320 tons daily, by this week's discussion I hope to raise Raichore deliveries for Madras to 1,200 tons daily. Supply waiting despatch on Great Indian Peninsula enormous, as already explained. Madras Railway power to receive will increase when new and borrowed engines come into work.

No. 169.

Encl. in No. 215.

No. 1754—A., dated Naini Tal, the 22nd August 1877.

See Nos. 142–4, 146–9, 152–7, 160.

From C. Robertson, Esq., Officiating Secretary to Government, North-Western Provinces and Oudh, to the Secretary to the Government of India.

I am directed to report, for the information of his Excellency the Viceroy and Governor-General in Council, that owing to the deficiency in the usual rain-fall there is every prospect of a most serious and extensive failure of the kharif crops in the North-Western Provinces and Oudh.

2. In the beginning of July it seemed as if the rains were commencing, and there was between the 1st and 3rd of that month a fall which was pretty general throughout the province. During the rest of the month very little rain fell except in the eastern districts of the Benares Division, and serious apprehensions were excited which were, however, for a time allayed by what seemed a recommencement of the regular rains in the first week of August. The fall during this week did not, however, extend to all districts in the Provinces, the Meerut and Agra Divisions, part of Rohilkhund, and the greater part of Oudh having received a very scant supply of rain. It was sufficient, however, to let agricultural operations be resumed everywhere, and had the fall continued all would have gone well. Unfortunately, the wind again went round to the west on the 6th, and a few days later it became a high scorching blast which raged for a week and did immense mischief, checking agricultural operations, drying up the crops which had germinated, and threatening to kill even those which were irrigated.

3. At present there is no prospect of improvement. The state of the crops is daily becoming worse, and, if rain do not fall in a few days, there can be no kharif, except perhaps in parts of the Benares Division, or where irrigation may avail to save the crop.

4. This serious failure affects the Meerut, Agra, Jhansi, and Rohilkhund Divisions, and the greater part of Oudh. As yet the prospects in Allahabad and Benares Divisions

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are better, but there also, unless rain fall soon, the hope of a harvest, except on irrigated land, must be abandoned.

5. The measures taken under the Lieutenant-Governor's orders to ascertain the extent of the calamity that is impending, and the provision there is for meeting it, have been separately reported. But as illustrating generally how grave the situation and the prospects are, I am desired to forward copies of some of the latest reports from Commissioners.

6. With reference to matters mentioned in these reports, I am to state that the Commissioner of Jhansi has been directed to report at once the character of the emigration which is taking place from that division, what classes are leaving, and where they are going. Authority has also been given to all Commissioners to begin at once to give employment on public works of Class A., described in the accompanying circular, to persons who, for want of it, may be in distress.

7. The Commissioner of Rohilkhund has also been directed to impress on the Collector of Budaun the importance of urging on the Zemindars of his district the duty of aiding their tenants in the present state of affairs.

8. Further details of the state of the Provinces will be communicated hereafter when the detailed reports, which have been called for, are received.

9. In conclusion, I am to say that, while every endeavour will be made to observe economy, his Honour trusts that he will be authorised to incur the expenditure which, judging from the present aspect of affairs, appears to be inevitable.

No. 170.

Telegram, dated Gunneshkhind, 22nd August 1877.

From Viceroy to Secretary of State.

Your two messages of 21st.

Traction engines already tried in India and failed; unsuitable for famine work.

We decline offer of light tramways; we urge instead immediate despatch of materials indented for Rajputana Railway, metre gauge.

No. 171.

Telegram, dated Gunneshkhind, 22nd August 1877.

From Viceroy to Secretary of State.

Good showers in parts of Kistna, Kurnool, South Arcot districts; light showers in parts of Bellary, Tinnevelly, Salem, and elsewhere. Prospects of autumn crop improved in part of Kurnool; worse in Madura and coast districts.

Numbers on works 1,077,682, on gratuitous relief 958,160. Prices not easier; supplies sufficient, save in a few small tracts.

Mysore crop prospects improved by continuance of light showers, and heavy rain in Coorg. Numbers on works 46,231; on gratuitous relief 187,175. Prices from twelve to eight pounds per rupee. Bombay, 6 inches rain in Carwar. Temple reported, on 17th, good rainfall, and autumn crops thriving in Dharwar, Belgaum, Sattara, and Sholapore; on western Ghâts and Concan rain sufficient; anxiety increasing in Kattywar and Guzerat, where rainfall withheld. Numbers on works 257,450, on gratuitous relief 121,072. Temple adds to-day good rain in Concan, elsewhere none worth mentioning. Strain on people in Deccan increasing; condition of crops in Khandesh and Guzerat critical. Kattywar agriculture suspended, failure apprehended. No sign of monsoon returning, but time yet for rain to come and restore everything.

Grain trade intensely active; total now supported by Government in all famine provinces 2,647,775.

Bengal and Burmah accounts good. Available rice surplus in Bengal estimated at 350,000 tons, if crop now in ground continues good. Central provinces crop prospects good; North-west and Oudh no rain, except at Benares; hot winds; autumn crops withering where sown without irrigation: much anxiety about condition of north-west, and effect of failure there. Prices dear, scarcity of fodder felt in Agra Division. Punjab crops suffering much from drought; in South Indore no rain. Gwalior threatened with famine. Malwa crops need early rain; Rajputana, no rain; crops damaged, position very critical; Baroda autumn crops part lost, rest in danger. Prices very dear. Hyderabad, Deccan, no rain.

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STATEMENT regarding the Scarcity in the Deccan and Southern Mahratta Country, together with a Summary of Government Orders issued during the week ending 30th August 1877.

Districts.	Area in Square Miles.	Affected Area in Square Miles.	Population of District.	Affected Population.	Collectors' Reports by Telegram, dated 24th to 30th August 1877.	Works in Progress.	Number of People employed. During the past Week.	Number of People employed. During the Week ending 25th Aug.	Number of People employed. Per-centage of labourers to population of District.	Grants, including the large works authorised in Government Resolution No. 6,152, of 27th Oct. 1876.	Expenditure up to latest known date.	Prices of Staple Grain in lbs. per Rupee. Ordinary Prices.	During the past Week.	During the present Week.	Average Rainfall, i.e., the average of all the Talukas for five years.	Average Rainfall during the past season of all the Talukas.	Average Rain-fall during the present season, as ascertained from Collectors' weekly reports.‖
										Rs.	Rs.						
Khandesh -	10,162	5,500	1,028,642	646,944	The rainfall, which has extended over four days, has been plentiful and general, gauging at Dhulia 9 inches; crops reviving and prospects much improved. People leaving relief works. 138 deaths from cholera.	Roads - Tanks - Miscellaneous*	9,733	8,683	·84	3,76,787	2,07,336	Jowari - 56 Bajri - 54	17¼ 16	17½ 15½	24·94	14·4	9·30
Násik -	8,113	2,000	729,252	250,000	Rain general, 3 inches at Malegaon, an inch and a half in northern, and half an inch in other Talukas. Prospects much improved. 81 deaths from cholera.	Ditto -	3,631	5,591	·76	5,49,146	3,31,687	Jowari - 54 Bajri - 47	18 16	18 16	35·29	27·55	14·57
Ahmednagar	6,647	5,650	778,938	677,376	1 inch 55 cents of rain at Ahmednagar, 1 inch 60 cents at Shrigonda. 1 inch 90 cents at Karjat, 8 cents at Newasa, 20 cents at Kopurgaon. Good rain in parts of Rahuri, Parner, and Akola. Crops benefited in these Talukas. Grain supply sufficient. People emigrating from four Talukas. 14 deaths from cholera.	Ditto -	†27,023	†34,970	4·51	15,63,887	6,81,031	Jowari - 76 Bajri - 66	13½ 12	15 12¾	24·3	10·65	8·43
Poona -	5,099	2,500	907,285	318,601	48 cents of rain at Mawal, 40 cents at Indapur, 10 cents at Poona, and 1 cent at Khed. Rain wanted everywhere. Crops in eastern districts withering, some withered. A few cases of cholera.	Ditto -	25,093	24,369	2·68	15,59,768	10,92,351	Jowari - 65 Bajri - 51	12 12½	12 12	30·6	20·76	13·59
Sholápur -	4,496	4,496	718,034	718,034	1 inch 18 cents of rain at Pandharpur, 50 cents at Sangola, and 10 cents at Sholapur; more required for young crops. Green grass plentiful. High prices cause suffering. 21 deaths from cholera.	Ditto -	14,518	14,699	2·04	30,76,834	16,57,069	Jowari - 66 Bajri - 60	10⅛ —	9¾ —	25·21	8·11	12·83
Satara -	4,988	2,682	1,064,002	461,000	Showers in some Talukas. Crops in western Talukas generally good, but in eastern are in much need of rain. Grain supply sufficient. 14 deaths from cholera.	Ditto -	18,508	19,046	1·79	11,74,532	9,10,313	Jowari - 39 Bajri - 35	11⅝ 12½	10⅛ 11	54·60	25·43	25·04
Kaládgi -	5,695	5,695	816,037	816,037	12 cents of rain at Badami; much kharif withering. Grain importation active. 31 deaths from cholera.	Ditto -	‡122,166	§122,166	14·97	27,69,248	17,14,028	Jowari - 56 Bajri - 76	9 9½	9 9½	22·43	6·13	6·15
Belgaum -	4,591	2,660	938,750	501,000	Upwards of an inch of rain in Athni, and nearly an inch in Gokak; showers in other Talukas. Crops improved where not past recovery. Grain supply sufficient. No cholera.	Ditto -	22,781	26,059	2·77	9,00,981	8,11,677	Jowari - 43 Bajri - 54	10 —	10 —	30·48	21·84	18·65
Dharwar -	4,564	3,000	988,037	630,000	From 3 to 82 cents of rain in six Talukas. No rain in south since 18th, and crops there perishing. Elsewhere crops suffering, and sowing late crops retarded in consequence of want of rain. Migration to western Talukas continues, and immigrants are arriving from other districts.	Ditto -	20,669	23,148	2·34	13,25,574	10,14,277	Jowari - 43	9	8¾	26·89	13·81	11·93
Total	54,355	34,183	7,963,927	5,018,992			264,122	278,731	3·5	1,32,96,252	84,19,769						

* Such as digging and repairing wells, prickly-pear clearances, &c.
‡ Corrected figures given.
† All the labourers upon the Dhond-Manmad Railway have been included under Ahmednagar.
§ Last week's figures given.
‖ For details and dates see table appended.

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Good rain has fallen in Khandesh, Nasik, three talukas of Ahmednagar, one taluka of Sholapur, and two talukas of Belgaum. In the rest of the famine area more is much wanted, and the crops are suffering. The fall in Khandesh has been very heavy, and removes almost all anxiety regarding that collectorate.

2. The average price of jowari continues to be 12½ lbs. per rupee; the only noticeable rise is in Satara, from which district crop reports are now not quite so favourable as they have hitherto been.

3. The number of people upon relief works in the nine affected districts is 278,731 against 264,122 last week, and there are also 802 hill-men and immigrants employed in Ratnagiri. The increase is general, except in Khandesh and Poona, and is due chiefly to the continuance of high prices and the absence of general rain. The increase shown against Ahmednagar is, however, partially due to the recent introduction of piece-work upon the Dhond-Manmar Railway. This piece-work is paid for according to a scale founded upon the famine wage, but the introduction of the system enables an industrious labourer to earn rather more than a mere subsistence. The plan has been introduced with a view to completing the railway at the earliest possible date, in order to facilitate the transport of grain into the famine districts of this Presidency and of Southern India.

4. Cholera appears to be decreasing.

5. The table showing the rainfall and prices in each taluka is appended.

6. The following table gives the expenditure by Government, during the week ending 11th August, upon charity in the relief of the aged and infirm poor, and in payments made to the young children of labourers employed upon relief works. Comparing the results shown in the table below with those shown in the last summary, it will be seen that the number of persons in receipt of Government charitable relief has decreased from 51,166 to 45,572, while the number of children under 7 years of age has increased from 80,292 to 80,388. During the week referred to, there was again a slight increase in the number of people upon relief works.

The number of people charitably relieved was 17 per cent. of the number of labourers upon relief works during the same week.

Districts.	Collector's Discretionary Grant.			Expenditure incurred under the authority of Government Resolution No. 312 C. W.— 1,116, of 26th December 1876, on account of children under 7 years of age whose parents are upon Relief Works.		
	Average number of persons relieved during the week.	Expenditure during the week.	Total expenditure up to date.	Average number of children, and of women taking care of them.	Expenditure during the week.	Total expenditure up to date.
	No.	Rs.	Rs.	No.	Rs.	Rs.
Khandesh - -	*	*	1,785	896	98	2,152
Nasik - -	141	65	1,130	1,704	245	16,026
Ahmednagar - -	1,867	650	30,491	12,208	1,392	30,936
Poona - -	16,571	9,815	99,257	9,921	1,291	51,478
Sholapur - -	7,204	4,849	93,006	3,980	644	39,638
Satara - -	4,416	3,007	37,921	6,477	797	38,459
Kaladgi - -	9,529	6,238	1,00,081	32,998	6,235	54,403
Belgaum - -	5,832	4,371	73,511	6,065	832	16,946
Dharwar - -	†	†	41,546	6,043	695	24,293
Kanara - -	11	7	5,214	‡	‡	1,526
Ratnagiri - -	1	4	427	96	11	372
Total - -	45,572	29,006	4,84,369	80,388	12,240	2,76,229

* No expenditure has been incurred by the Collector. † Collector's return not received.
‡ No expenditure has been incurred by the Collector and the Executive Engineer.

7. The following table gives the distribution of the people among the relief works in the nine affected districts employing 1,000 labourers, or more, during the week ending 18th August. It will be seen that 223,719, or more than five-sixths of the labourers, were concentrated upon the works enumerated :—

District.	Works.	Number of Labourers.	Total.	Remarks.
Khandesh - {	Dhulia Pimpalnair Road - -	2,138	4,560	
	Songir-Nandoorbar Road - -	1,297		
	Jhorga-Bhorkand Road - -	1,125		

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District.	Works.	Number of Labourers.	Total.	Remarks.
Nasik - -	Bawarbari-Satana Road - -	1,343	1,343	
Ahmednagar	Dhond-Manmad Railway - -	24,473	25,866	
	Barighat-Kolhar Road - - -	1,393		
Poona - -	Nira Canal - - - -	11,851	22,439	
	Mutha Canal - - - -	4,385		
	Motoba Tank - - - -	4,187		
	Shirsophal Tank - - -	2,016		
Sholapur	Ashti Tank - - - -	3,711	9,356	
	Pangaon Lake - - - -	2,921		
	Bhend Tank - - - -	1,651		
	Sholapur-Takli Road - - -	1,073		
Satara - -	Mhaswad Tank - - -	8,336	17,165	
	Nehr Tank - - - -	4,894		
	Pingli Tank - - - -	3,935		
Kaladgi - -	Indi-Sirodon Road - - -	19,360	104,322	
	Sholapur-Bellary Road - - -	14,098		
	Panchgaon-Bagalkot Road - -	10,823		
	Muddibihal-Talicot Road - -	9,910		
	Bagewari-Mangoli Road - -	8,864		
	Hipergi-Talikot Road - - -	8,763		
	Shindgi-Kudni Road - - -	7,754		
	Sholapur-Hubli Road - - -	5,576		
	Hundgund-Nundwadgi Road - -	5,307		
	Bagalkot-Hungund Road - -	5,126		
	Bijapur-Hipergi Road - - -	3,521		
	Kaladgi-Badami Road - - -	2,854		
	Bijapur-Athni Road - - -	2,366		
Belgaum- -	Gokak Canal - - - -	10,085	20,887	
	Belgaum-Panchgaon Road - -	3,650		
	Athni-Kanamadi Road - - -	3,490		
	Athni-Belanki Road - - -	1,484		
	Metalling Mail Road - - -	1,163		
	Kohlapur-Bijapur Road - -	1,015		
Dharwar	Karwar-Bellary Road (Two Sections) -	8,456	17,781	
	Poona-Hurryhur Road - - -	3,846		
	Ron-Nawalgund Road - - -	2,402		
	Hullial-Annigerry Road - -	1,751		
	Hubli-Kaladgi Road - - -	1,326		
	Grand total - - - -		223,719	

8. Tables (A.) and (B.) are appended as usual. It will be seen that during the week ending 18th August the number of people upon Civil works in the nine affected districts was 23,601, the number upon works under Public Works Department Agency being 239,423. The proportion of people upon the former continues, therefore, less than 10 per cent. of the total. It is to be noted that the figures given in these tables are taken from the progress returns of the works, and are brought up to the week ending 18th August, while the figures in the table prefixed to this summary are taken from the Collectors' telegrams, and refer to the week ending 25th August. It will be seen that the net decrease in the number of people on relief works during the 10 weeks subsequent to 9th June has amounted to 142,101.

9. Maps are not sent with this summary.

10. A table is appended, showing the condition of the affected Native States.

11. With regard to the movements of food-grains, 748 tons were exported from Bombay to the Southern Mahratta ports during the week ending 25th August, and

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during the same period 5,038 tons were carried by the Great Indian Peninsula Railway to stations upon the Poona-Sholapur and Nasik-Bhusawal lines, making a total of 5,786 tons for the week. The table below shows the quantities of grain sent by sea and rail from October till the 25th August to the Southern Mahratta ports and the railway stations in the distressed districts. It will be seen that the total amount delivered up to the 25th August was 384,161 tons:—

Food-grains sent to	In October, November, and December 1876.	In January, February, and March 1877.	In April 1877.	In May 1877.	In June 1877.	In July 1877.	In August (up to 25th).	Total.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Southern Mahratta ports	44,215	46,332	21,399	28,657	4,491	857	13,048	158,999
South-Eastern line, from Poona to Sholapur.	67,195	41,708	12,856	12,594	20,348	20,484	15,958	191,143
North-Eastern line from Nasik to Bhusawal.	12,829	7,471	2,346	1,221	2,014	1,524	6,614	34,019
Total - -	124,239	95,511	36,601	42,472	26,853	22,865	35,620	384,161

12. During the week very good rain has fallen in Khandesh and parts of Nasik, fair rain has fallen in the rest of Nasik and in parts of Ahmednagar, Sholapur, and Belgaum, while in the remainder of the famine area the showers have been light where they have fallen at all. This has been chiefly eastern rain, the south-west monsoon on the coast still continuing to be very inadequate. There has also been very favourable rain in Surat, and the fall in Broach and Kattywar has not been unsatisfactory. More rain is required in Kaira and Ahmedabad, but, upon the whole, anxiety regarding Guzerat and Kattywar, Khandesh, and Nasik, is very materially lessened.

Prices of food-grains continue almost stationary.

Imports of grain on the coast show a very marked decrease, due probably to two causes, viz., the celebration of Cocoa-nut day by the seafaring population, and the diminution in the number of steamers engaged in the trade owing to the recent loss of two of their number. Imports by rail again show a slight decrease, due to the cause already more than once noticed.

There has been a net increase in the number of people upon works of 14,350 and an increase of 96 in the number of young children. On the other hand, there has been a decrease of 5,594 in the number of people upon charitable relief, but this result is due in some measure to the non-receipt of complete returns.

A distinct improvement in the general situation has taken place since last week. Anxiety is to a great extent removed regarding Kattywar, Guzerat, Khandesh, and Nasik, but the continuance of high prices, and absence of general rain, in the seven famine collectorates south of Nasik, retard improvement in the condition of the people of those districts.

Cholera appears to be decreasing.

(Signed) C. J. MERRIMAN,
for Major-General, R.E., Secretary
to Government.

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STATEMENT regarding the condition of Native States.

Native States.	Area in Square Miles.	Affected Area in Square Miles.	Population of State	Affected Population.	Reports from Political Agents for the week ending	Works in progress.	Number of People employed: During the past Week.	Number of People employed: During the present Week.	Number of People employed: Per-centage of Labourers to Population of District.	Allotments granted.	Expenditure up to latest known date.	Prices of Staple Grain in lbs. per Rupee: Ordinary Prices.	Prices of Staple Grain in lbs. per Rupee: During the past Week.	Prices of Staple Grain in lbs. per Rupee: During the present Week.
										Rs.	Rs.			
Kolhapur and Southern Mahratta Country States.	5,408	2,999	1,373,988	620,482	19th August:—Good rain. Prices falling. Little cholera at Inchalkaranji; 8 cases, 7 deaths. In other States no case has been reported.	Roads - Tanks - Miscellaneous*	26,468†	22,566†	1·64	7,81,286	7,02,260	Jowari - 51 Bajri - 44	10⅞ 10	11⅛ 11⅛
Akalkot - - -	498	378	78,222	58,000	15th August:—24 cents of rain at Akalkot. Prices rising.	Ditto -	434	623	·79	72,602	65,558	Jowari - 61	11⅞	11⅛
Jath - - -	884	879	64,000	63,628	Report not received - - - - - -	Ditto -	484	400	·62	86,949	43,667	Jowari - 63	8 1/16	§
Phaltan - - -	397	397	59,124	59,124	18th August:—No rain. The state of the crops is the same as reported last week.	Ditto -	100	96	·15	23,500	19,531	Jowari - 54	12⅛	12⅛
Pant Pratinidhi - -	218	138	68,335	44,594	20th August:—Crops still in a good condition. Rain wanted everywhere.	Ditto -	271	252	·36	38,285	20,920	Jowari - 58⅛	11⅛	11⅛
Sawant Wari - -	904	—	190,814	—	Telegram dated 28th August:—Half an inch of rain below Ghauts. Crops good. Cholera decreasing.	Ditto -	183	183	·09	2,525	2,162	Nachani - 55	17¾	18 1/16
Savanur - - -	70	18	15,757	2,020	18th August:—1 cent of rain. Sufficient supply of grain, and importation continues. Jowari slightly dearer. Early crops still in good condition. More rain urgently wanted for rice crop.	Ditto -	‡	‡	‡	10,000	1,844	Jowari - 61½	10¼	9¾
Total -	8,374	4,804	1,850,190	847,848						10,15,147	8,55,937			

* Such as digging and repairing wells, prickly-pear clearances, &c.

† Figures for 4th and 11th August given, complete returns for the week ending 18th August not having been received.

‡ The Savanur great tank work has been stopped owing to rainfall.

§ Report not received.

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A.

TABLE contrasting the Number of Labourers upon Relief Works under Civil and Public Works Department Agencies.

(Accompaniment to Statement No. XLI.)

Districts.	For the week ending 12th May 1877.		For the week ending 19th May 1877.		For the week ending 26th May 1877.		For the week ending 2nd June 1877.		For the week ending 9th June 1877.		For the week ending 16th June 1877.		For the week ending 23rd June 1877.		For the week ending 30th June 1877.		For the week ending 7th July 1877.		For the week ending 14th July 1877.		For the week ending 21st July 1877.		For the week ending 28th July 1877.		For the week ending 4th August 1877.		For the week ending 11th August 1877.		For the week ending 18th August 1877.	
	Civil Agency.	Public Works Agency.	Civil Agency.	Public Works Agency.	Civil Agency.	Public Works Agency.	Civil Agency.	Public Works Agency.	Civil Agency.	Public Works Agency.	Civil Agency.	Public Works Agency.	Civil Agency.	Public Works Agency.	Civil Agency.	Public Works Agency.	Civil Agency.	Public Works Agency.	Civil Agency.	Public Works Agency.	Civil Agency.	Public Works Agency.	Civil Agency.	Public Works Agency.	Civil Agency.	Public Works Agency.	Civil Agency.	Public Works Agency.	Civil Agency.	Public Works Agency.
Khandesh -	—	2,591	—	2,559	—	2,404	—	2,691	201	2,812	156	3,062	—	1,863	6	1,442	64	2,339	5	2,782	72	2,480	154	2,111	582	2,380	739	3,174	1,819	5,971
Násik - -	—	10,719	—	10,587	—	8,148	—	8,610	—	6,813	—	5,088	—	5,258	—	4,911	—	4,087	—	4,226	—	3,786	—	3,932	—	3,243	—	3,419	—	3,631
Ahmednagar -	2,335	29,211	2,478	26,736	2,949	25,851	2,874	28,780*	3,347	35,162	3,190	32,091	2,392	30,979	2,273	29,765	738	33,212	357	35,341	207	36,616	104	25,313	—	23,387	—	25,447	8	26,425
Poona - -	3,299	39,516	3,588	41,425	5,832	41,959	5,597	41,219	5,966	41,282	4,625	37,093	3,874	33,103	4,037	29,900	3,834	27,440	3,660	27,323	3,513	26,111	3,223	26,271	2,721	26,068	2,553	24,674	1,852	23,420
Sholápur - -	9,985	51,337	10,068	49,647	13,177	49,733	15,675	52,491	16,794	44,776	15,437	39,877	12,394	35,977	7 257	36,178	4,478	32,023	3,066	28,634	3,069	25,163	2,991	20,385	2,761	20,626	2,731	12,055	3,029	11,492
Satara - -	1,016	39,400	1,511	42,942	1,926	46,873	2,560	47,849	3,009	52,051	3,004	47,650	1,442	44,522	1,400	41,046	808	35,778	795	33,322	813	24,469	808	20,961	241	20,830	512	19,820	659	18,509
Kaládgi - -	8,171	57,079	7,192	68,380	6,725	72,615	6,956	77,647	6,821	79,582	7,373	72,401	6,534	66,272	8,119	68,802	10,000	73,653	9,308	68,620	9,044	72,063	11,311	82,871	12,510	100,832	13,731	109,546	14,050	108,116
Belgaum - -	4,063	41,833	3,569	41,709	2,154	40,456	2,137	40,234	2,352	36,686	2,018	26,738	1,380	23,231	823	20,616	541	23,760	599	20,977	8	22,019	11	22,422	640	24,749	—	25,206	—	22,782
Dharwar - -	1,865	50,111	4,514	51,560	986	52,670	2,005	56,165	2,037	62,869	4,183	60,277	4,749	53,915	2,910	38,345	3,188	24,680	2,886	21,800	3,059	19,341	1,193	20,309	867	21,113	1,210	22,237	2,184	19,077
Total - -	30,734	321,802	32,940	335,545	33,749	340,709	37,804	355,686	40,507	362,033	39,986	324,277	32,765	295,120	26,825	271,005	23,651	256,972	20,676	243,025	19,785	232,048	19,795	234,475	20,322	243,228	21,476	245,580	23,601	239,423
Grand total -	352,536		368,485		374,458		393,490		402,540		364,263		327,885		297,830		280,623		263,701		251,833		244,270		263,550		267,056		263,024	
Ratnagiri -	256	2,879	251	2,724	245	1,892	255	1,837	264	2,143	571	1,014	395	618	258	559	502	430	264	559	159	574	260	790	147	736	211	850	145	657
Kanara - -	1,512	4,147	1,549	5,084	1,264	3,652	1,112	1,657	286	694	120	165	102	124	60	37	7	11	23	8	8	6	—	—	—	—	—	—	—	—
	1,768	7,026	1,800	7,808	1,509	5,544	1,367	3,494	550	2,837	691	1,179	497	742	318	596	509	441	287	567	167	580	260	790	147	736	211	850	145	657
Total - -	8,794		9,608		7,053		4,861		3,387		1,870		1,239		914		750		854		747		1,050		883		1,061		802	
Grand total of the 11 districts	361,330		378,093		381,511		398,351		405,927		366,133		329,124		298,744		281,373		264,555		252,580		245,320		264,433		268,117		263,826	

* Alteration made in the Ahmednagar and the total figures from 2nd June in consequence of the receipt of supplementary returns from that date from a division on the Dhond and Manmad State Railway.

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B.

TABLE showing the Weekly Expenditure and description of Persons employed on Relief Works under Civil and Public Works Department Agencies, respectively.

Week ending	Civil Agency.					Public Works Department Agency.					Grand total of				
	Expenditure up to date.	Men.	Women.	Children.	Total.	Expenditure up to date.	Men.	Women.	Children.	Total.	Expenditure up to date.	Men.	Women.	Children.	Total.
	Rs.					Rs.					Rs.				
12th May -	13,20,783	10,573	14,529	5,632	30,734	35,63,739	123,743	146,829	51,230	321,802	48,84,522	134,316	161,358	56,862	352,536
19th May -	13,41,025	11,301	15,309	6,240	32,940	37,90,096	128,580	153,215	53,750	335,545	51,31,121	139,881	168,614	59,990	368,485
26th May -	13,64,962	11,330	15,862	6,557	33,749	40,26,856	130,188	155,457	55,064	340,709	53,91,818	141,518	171 319	61,621	374,458
2nd June -	13,89,409	12,629	17,449	7,726	37,804	43,00,145	135,901	162,450	57,335	355,686*	56,89,554	148,530	179,899	65,061	393,490
9th June -	14 19,182	12,442	19,283	8,782	40,507	45,64,624	136,668	166,202	59,163	362,033	59,83,756	149,110	185,485	67,945	402,540
16th June -	14,52,130	11,543	19,181	9,262	39,986	48,10,047	119,657	150,940	53,680	324,277	62,62,177	131,200	170,121	62,942	364,263
23rd June -	14,78,541	9,604	15,800	7,361	32,765	50.16,304	108,473	138,285	48,362	295,120	64,94,845	118,077	154,085	55,723	327,885
30th June -	15,01,568	7,851	13,084	5,890	26,825	52,26,855	98,679	127,928	44,398	271,005	67,28,213	106,530	141,012	50,288	297,830
7th July -	15,20,868	6,831	11,872	4,948	23,651	54 54,380	91,512	123,175	42,285	256,972	69,75,248	98,343	135,047	47,233	280,623
14th July -	15,48,131	6,031	10,195	4,450	20,676	56,46,717	88,189	115,322	39,514	243,025	71.94,848	94,220	125,517	43,964	263,701
21st July -	15,64,902	5,942	9,734	4,109	19,785	58,25,385	84,030	110,868	37,150	232,048	73,90,287	89,972	120,602	41,259	251,833
28th July -	15,81,894	5,769	9,014	4,112	19,795	60,50,032	80,905	106,991	36,579	224,475	76,31,926	86,674	116,905	40,691	244,270
4th August -	16,26,484	6,087	9,708	4,527	20,322	62 85,779	85,847	117,198	40,183	243,228	79,11,263	91,934	126,906	44,710	263,550
11th August -	16,51,055	6,242	10,376	4,858	21,476	65,25,445	86,031	118,619	40,930	245,580	81,76,500	92,273	128,995	45,788	267,056
18th August -	16,73,929	6,985	11,020	5,596	23,601	67,45,840	84,254	115,244	39,925	239,423	84,19,769	91,239	126,264	45,521	263,024

NOTE.—The totals are not invariably the sum of the men, women, and children, as in a few returns these particulars have not been given, the total number of labourers alone having been entered.
These figures are for the nine distressed Districts only. The people upon Relief Works in Ratnagiri and Kanara are shown in Table A.
* See first Note, Form A.

TABLE contrasting the RAINFALL as yet reported during the current season (*i.e.*, from 1st January 1877) with the RAINFALL of the past season, showing also the current prices (in pounds per rupee) of staple food-grain.

(According to the Collectors' Weekly written Reports.)

Collectorate.	Taluka.	Rainfall.						Staple Food-grains.	
		Average Annual Rainfall.	Total Rainfall during past year.	Rainfall prior to 19th June 1877.	Rainfall of and subsequent to 19th June 1877.	Total for current season.	Average for the Collectorate during current season.	Price of Jowari for week ending 18th August.	Price of Bajri for week ending 18th August.
		Inches.	Inches.	Inches.	Inches.	Inches.	Inches.		
KHANDESH.	Raver	—	—	0·46	9·15	9·61	9·30	18·25	18·25
	Sauda	—	13·40	2·66	3·98	6·64		18·00	18·62
	Pimpalner	26·78	16·81	4·76	5·31	10·07		24·00	18·75
	Chopra	—	11·97	3·05	7·39	10·44		16·00	16·75
	Jamner	—	13·26	1·56	8·38	9·94		18·50	17·75
	Nasirabad	—	12·31	1·16	3·18	4·34		17·25	16·88
	Sirpur	20·55	11·24	3·65	5·15	8·80		18·88	17·75
	Amalner	21·93	15·15	1·95	5·83	7·78		17·25	17·75
	Nizampur	—	—	3·30	8·88	12·18		18·88	18·75
	Parola Petha	—	—	4·52	4·54	9·06		16·25	16·00
	Erandol	30·40	14·79	1·64	4·53	6·17		15·50	15·50
	Nandurbar	24·74	16·57	3·58	6·92	10·50		18·00	18·25
	Pachora	28·31	12·96	4·63	7·34	11·97		15·50	15·00
	Virdel	18·57	7·85	3·83	2·65	6·48		18·00	17·75
	Bhadgaon Petha	—	—	4·71	4·59	9·30		15·50	14·25
	Chalisgaon	28·19	13·21	2·45	4·01	6·46		16·25	15·25
	Taloda	29·40	28·32	3·09	9·76	12·85		20·62	20·50
	Bhosawal	26·47	8·41	2·82	10·55	13·37		17·25	16·88
	Edalabad Petha	—	—	2·58	4·76	7·34		19·62	18·88
	Shahada	21·36	16·60	2·54	8·00	10·54		21·00	19·50
	Yowal	—	—	4·31	7·74	12·05		16·00	17·00
	Dhulia	23·83	12·73	2·36	6·47	8·83		17·25	16·00
NASIK.	Igatpuri	109·59	114·57	5·57	47·59	53·16	14·57	19·25	15·38
	Nasik	29·41	15·97	3·22	5·15	8·37		19·63	15·50
	Dindori	25·57	17·65	5·94	6·00	11·94		—	16·00
	Sinnar	22·49	10·65	3·12	5·04	8·16		17·25	15·88
	Niphar	17·94	12·39	2·95	5·22	8·17		—	14·00
	Chandor	32·55	12·58	5·32	3·83	9·15		18·00	16·50
	Yeola	26·62	14·96	6·32	2·35	8·67		16·50	14·00
	Nandgaon	26·15	13·66	5·26	7·48	12·74		15·00	14·50
	Malligaum	24·60	10·42	3·96	4·74	8·70		18·00	17·50
	Baglan	38·60	14·32	6·88	2·68	9·56		20·12	18·38
	Kalwan		16·10	4·55	4·19	8·74		14·62	17·25
	Peint State	38·20	77·40	4·58	22·95	27·53		—	16·50

Up to 18th August 1877. Up to 18th August 1877.

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Collectorate.	Taluka.	Rainfall.						Staple Food-grains.	
		Average Annual Rainfall.	Total Rainfall during past year.	Rainfall prior to 19th June 1877.	Rainfall of and subsequent to 19th June 1877.	Total for current season.	Average for the Collectorate during current season.	Price of Jowari for week ending 18th August.	Price of Bajri for week ending 18th August.
		Inches.	Inches.	Inches.	Inches.	Inches.	Inches.		
Ahmednagar.	Jamkhed	28·76	8·77	4·32	6·04	10·36	8·43	9·00	9·00
	Karjat	21·38	6·70	5·55	6·57	12·12		12·00	11·00
	Shrigonda	28·12	15·29	3·65	1·75	5·40		12·00	12·00
	Kopargaon	23·57	10·50	5·89	2·52	8·41		15·00	15·00
	Nagar	27·99	8·64	8·47	3·59	12·06		13·00	13·00
	Rahuri	23·60	10·57	6·53	1·51	8·04		13·00	12·00
	Newasa	24·57	13·49	4·25	3·31	7·56		13·00	13·00
	Sheogaon	29·34	20·00	5·03	4·88	9·91		12·00	12·00
	Sangamner	20·16	6·45	3·81	2·99	6·80		16·00	14·00
	Akola	21·33	8·98	2·27	3·17	5·44		16·00	13·00
	Parner	23·30	8·28	3·05	3·61	6·66		12·00	12·00
					Up to 18th August 1877.	Up to 18th August 1877.			
Poona.	Junnar	22·34	17·90	4·91	4·70	9·61	13·59	*11·12	*11·25
	Khed	23·50	18·90	3·01	5·40	8·41		13·00	12·05
	Ambegaon Petha	—	—	8·17	5·22	13·39		10·25	10·25
	Mawal	—	76·79	4·44	35·91	40·35		14·25	12·75
	Haveli	33·10	14·90	3·31	7·92	11·23		10·20	10·30
	Petha Mulshi	—	—	5·12	20·42	25·54		—	12·12
	Purandhar	23·24	17·54	4·83	5·66	10·49		13·12	11·87
	Sirur	17·30	10·94	2·81	2·43	5·24		12·50	11·50
	Bhimthari	20·73	5·97	2·80	0·97	3·77		11·25	11·25
	Petha Baramati	—	—	5·84	2·90	8·74		11·80	11·60
	Indapur	21·76	4·82	8·10	4·59	12·69		10·15	10·10
					Up to 18th August 1877.	Up to 25th August 1877.			
Sholapur.	Sholapur	28·35	8·68	7·14	8·49	15·63	12·83	10·35	
	Barsi	29·40	11·14	7·69	4·11	11·80		11·25	
	Madha	25·32	6·45	9·40	5·40	14·80		10·80	
	Karmala	22·37	8·41	6·27	7·83	14·10		9·62	
	Pandharpur	24·64	6·80	6·09	4·88	10·97		11·88	
	Sangola	21·76	4·29	6·20	4·11	10·31		10·05	
	Malsiras	18·06	11·78	9·35	2·87	12·22		10·25	
					Up to 18th Aug. 1877.	Up to 18th Aug. 1877.			
Satara.	Satara	40·40	33·59	2·92	11·96	14·88	25·04	10·00	12·50
	Man	20·89	9·35	3·78	0·70	4·48		9·50	9·50
	Jauli	74·30	59·84	6·56	33·38	39·94		12·25	12·50
	Patan	61·71	48·82	4·22	29·62	33·84		13·25	14·25
	Malcolm Peth	273·22	243·18	7·23	115·96	123·19		—	12·50
	Tasgaon	25·77	9·79	12·31	3·97	16·28		10·50	12·00
	Khanapur	23·34	11·40	5·36	3·22	8·58		10·00	10·25
	Walwa	25·24	12·85	4·63	7·66	12·29		13·00	12·50
	Wai	32·88	25·34	4·77	8·69	13·46		12·50	12·50
	Khatao	22·38	11·51	7·21	1·33	8·54		11·75	12·00
	Karad	27·97	19·75	3·57	9·76	13·33		12·00	11·50
	Koregaon	27·77	20·19	4·60	7·10	11·70		12·50	12·25
					Up to 18th August 1877.	Up to 18th August 1877.			
Kaladgi.‡	Indi	27·32	3·98	2·76	1·33	4·09	6·15†	‡10·50	‡10·50
	Mudebihal	24·46	5·14	1·76	0·94	2·70		11·00	10·00
	Shindgi	20·83	6·53	2·96	1·20	4·16		10·50	10·50
	Bagewadi	23·98	6·18	4·59	1·37	5·96		9·25	9·25
	Bijapur	17·90	3·71	8·23	2·60	10·83		9·20	10·40
	Bagalkot	22·77	8·87	7·93	1·23	9·16		9·00	8·50
	Badami	22·00	7·17	4·55	1·97	6·52		9·00	—
	Hungund	20·22	7·49	2·85	2·64	5·49		9·50	8·00
	Kaladgi	—	—	5·80	0·60	6·40		8·20	8·10
					Up to 11th August 1877.	Up to 11th August 1877.			
Belgaum.	Belgaum	41·88	35·78	6·88	22·77	29·65	18·65	§9·00	§10·00
	Sampgaon	32·52	17·97	6·15	6·93	13·08		9·00	—
	Chikori	19·86	15·56	8·02	6·61	14·63		11·00	—
	Parasgad	21·38	15·77	9·64	0·92	10·56		9·00	—
	Gokak	19·72	6·94	5·12	3·40	8·52		10·00	10·00
	Athni	18·57	6·74	7·90	2·51	10·41		11·00	—
	Bidi	59·44	50·64	3·04	40·69	43·73		9·00	—
					Up to 11th Aug. 1877.	Up to 11th Aug. 1877.			

* For the week ending 25th August.
† This is chiefly eastern rain
‡ The figures for Kaladgi are for the week ending 11th August, later returns not being available.
§ For the week ending 11th August.

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Collectorate.	Taluka.	Rainfall.						Staple Food-grains.	
		Average Annual Rainfall.	Total Rainfall during past year.	Rainfall prior to 19th June 1877.	Rainfall of and subsequent to 19th June 1877.	Total for current season.	Average for the Collectorate during current season.	Price of Jowari for week ending 18th August.	Price of Bajri for week ending 18th August.
		Inches.	Inches.	Inches.	Inches.	Inches.	Inches.		
Dharwar.	Mundargi Petha -	—	—	6·59	2·31	8·90		10·12	
	Hubli - -	27·83	14·18	9·06	7·65	16·71		9·25	
	Navalgund -	22.22	6·65	9·30	2·20	11·50		10·12	
	Nargund Petha -	—	—	5·00	1·03	6·03		8·75	
	Ron - -	23·48	4·70	7·94	1·95	9·89		7·75	
	Gadag - -	25·67	11·10	6·85	3·75	10·60		10·12	
	Bankapur - -	21·83	15·23	8·90	6·40	15·30		9·25	
	Ranibennur -	22·53	10·90	7·74	2·05	9·79	11·93	9·25	
	Hangal - -	34·83	22·39	7·59	8·30	15·89		9·25	
	Karajgi - -	25·23	13·33	8·89	2·90	11·79		8·25	
	Kalghatgi - -	33·09	20·23	3·30	6·66	9·96		9·25	
	Kod - -	21·26	15·46	3·95	4·24	8·19		8·25	
	Dharwar - -	32·34	20·71	5·78	9·04	14·82		8·00	
	Mugad Petha -	—	—	3·03	14·71	17·74		9·25	

Up to 18th August 1877. Up to 8th August 1877.

Telegraphic returns of more recent rain have been received, but cannot yet be properly collated.
The monsoon set in on the 19th June above Ghauts.

No. 173.

Encl. in No. 15.

From Major-General M. K. Kennedy to Colonel O. T. Burne.

My dear Colonel Burne, 22nd August 1877.

I think that Jeypore Durbar should be advised not to be in too great a hurry to commence public works for relief purposes; the fact of the failure of rain does not mean that the people at once become helpless and without resource; they can subsist for some time on their means, and it is an error, calculated to lead to needless outlay, to assume they are without any means.

Even if favourable rain had fallen, or should fall, there is still an interval, *i.e.*, until the crops can mature, during which the people would have to subsist on the resources I assume them to have; later on, if the scarcity be clearly developed, and when the people begin to show signs of distress, the State might open well-selected public works; these should, if possible, be works of irrigation, particularly large tanks, such as are capable of holding at least two years' supply of water.

The earthen dams of such tanks must very generally be heavy works on which large bodies of unskilled labourers can be profitably employed and efficiently superintended. On these works the scale of wages and tests that we have found effectual should be introduced, and I shall be most happy to furnish the Governor-General's Agent with copies of all our orders bearing on the subject.

But if the dearth and the consequent distress be not very great, and very widely extended, I think Mr. Lyall's proposal for carrying through the Western Rajpootana Railway a very good one, and it would probably supply nearly all the relief work that may be needed, and of a very suitable kind.

The Durbar should very carefully avoid small scattered works near the homes of the people needing relief.

As to the specific measures proposed by the Durbar, No. 1 is good in so far as it may encourage the "Bowras" to grant credit; but the Durbar should enter into no engagement on this head, which they might hereafter find it difficult to fulfil. The remissions of court fees would imply no pledge; but if the Durbar were to encourage loans under a promise to the lenders that they would assist in their recovery, they would, to a great extent, become responsible for such recovery.

Should there be a drought it would be a fair and proper arrangement to use discretion and lenity in collecting arrears of revenue.

As regards the third proposal of granting loans, *i.e.*, Tuccavi, I doubt the wisdom or necessity of such an arrangement, except for purposes of land improvement, such as digging or deepening wells, at all events at so early a period of the distress. Such a

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plan would only be needed when the time for the next sowing occurs, to enable the cultivators to procure seed or cattle; even then Tuccavi should be granted very cautiously, and only to those who may be small holders, and presumably without capital or credit.

All waste pasturage belonging to the State might be freely opened by grazing.

Alms or poor houses should not be opened too soon; at an early period of drought, the people are able to maintain their own poor.

From the above it will be seen that, on failure of a season's crops, I think that, for some time, the people should be left to their own resources, which they must possess, and that relief, either in the way of employment or charity, should only be given after a time when the people begin to feel distress, and have exhausted their own means.

That when relief is given it should, as regards charity, be very closely controlled, and, as regards works, be afforded on large undertakings, where labour can be properly concentrated and overlooked, and which, when completed, are likely to be of permanent use.

That Tuccavi, except for land improvement, should be sparingly given, and only at that period of the distress when preparations for renewed cultivation are being made; if this be not attended to, there is danger in "Tuccavi" being merely another name for alms.

No. 174.

Telegram, dated Gunneshkhind, 23rd August 1877.

From VICEROY to SECRETARY OF STATE.

Madras indent on you for locomotives and waggons not sent to us; irregularity causes inconvenience. In July we questioned sufficiency of Madras rolling stock; they did not fully explain plans, but asked for 16 engines and 200 waggons; we borrowed and have partly arranged for engines, but difficulty about waggons. Shall meet Duke in three days, and after inquiry will telegraph definitely. Additional supply of engines and waggons probably necessary; present information incomplete.

No. 175.

Telegram, dated Simla, 23rd August 1877.

From PRESIDENT to SECRETARY OF STATE.

We have decided, for reasons explained by letter and with Viceroy's approval, after consultation at Poona, to obtain 60 additional engines on behalf of the State, and not for exclusive use of Great India Railway, though specially to meet its wants should they continue. We therefore request that immediate orders be given for 60 additional broad-gauge engines of same type as the only engine now under construction. The contracts should provide for delivery as rapidly as is consistent with good work. The deliveries on previous order and of any new demand stated in your message of 20th compare very unfavourably with delivery of Great Indian engines stated in your message of 14th, and every effort should be made to expedite deliveries. Perhaps bonus might be offered for earlier deliveries.

No. 176.

Telegram, dated Gunneshkhind, 23rd August 1877.

From VICEROY to SECRETARY OF STATE.

I earnestly beg immediate sanction to project for laying rails on Dhond and Munmar line, and to early despatch of material. See my telegrams of 2nd and 3rd and our Despatch of 6th August. This line will immensely shorten famine traffic and relieve transport difficulties. The Bombay Railway officers estimate that it will set free 36 Great Indian Peninsula engines.

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No. 177.

Telegram, dated 23rd August 1877.

From Secretary of State to Viceroy.

Your telegrams Dhond and Munmar Railway.
Construction on broad gauge sanctioned. Materials will be sent out as soon as possible.

No. 178. Encl. in No. 215.

Telegram, dated the 23rd August 1877.

From Resident, Hyderabad, to C. Bernard, Esq., Viceroy's Camp.

As affairs in Hyderabad territory are becoming critical, I beg to report as follows for Viceroy's information:—His Highness' Government has already expended 10 lakhs on famine relief, and a further sum of 15 lakhs is now under allotment. Revenue for past year short by 37 lakhs, owing to failure of crops. Present forecast contemplates necessary relief of minimum number of 120,000 persons in four worst districts, being 15 per cent. of their full population, for 18 months at 5 lakhs per mensem; the districts are Lingsagar, Raichore, Shorapore, and Goolburga. The above per-centage of persons is, in my opinion, an under estimate; on the other hand, if next season be of ordinary character, full relief will not be required for the whole of estimated term; should failure of rain continue during rest of year throughout the whole of the Hyderabad territory, the demand on Government will be little short of three crores, including loss of revenue; and to meet this, it is understood that no funds are now, or are likely to be, available. At present the number receiving relief in the four districts named above is 70,000, but this does not represent the real number of sufferers, many of whom will not leave their homes for relief. In these districts jowari and rice are about 8 lbs. the Government rupee; if fair rain falls generally throughout territory within a short time, there will, of course, be a great change in present prospects; but any such change in those of four named districts will depend on rainfall in the east monsoon, the effects of which can be felt till March next. At present weather hot, sky clear, and no signs of rain. 300 tons of grain daily coming from Bombay to capital, and it is believed that there are considerable stocks in the territory, except in the four districts, but holders keep their stores back, and prices continue at famine rates, rice being 8 lbs. per Government rupee.

No. 179. Encl. in No. 215.

Telegram, dated the 23rd August 1877.

From Resident, Hyderabad, to C. Bernard, Esq., Commerce.

Referring to clear message of this day, I deem it right to report that Nizam's treasury is empty, and that efforts made by Minister to raise money locally have failed. Looking at present and future requirements, and probable difficulties from continuous failure of rain, I quite expect that his Highness' Government will be compelled to solicit a loan from British Government to enable famine expenditure.

No. 180. Encl. in No. 215.

No. 8-B., dated Hyderabad Residency, 23rd August 1877.

From the Second Assistant-Resident, Hyderabad, to C. Bernard, Esq., C.S.I., Additional Secretary to the Government of India.

I am directed to report, for the information of the Government of India, that late reports from Berar betoken some uneasiness on account of want of rain, especially in the

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Rainfall from 1st June up to 1st August, since which no returns yet received, but it may be stated that there has been no rain in Akola. A fall in Mulkapur, however, has been alluded to in a late report.

	inches.
Akola District - - -	9½
Mulkapur (Buldana District)	4½

Akola District and the Mulkapur taluka of the Buldana District, where the rainfall, as shown in the margin, has been unusually scanty. In the other districts, though rain is urgently required everywhere, there have been showers more or less copious, and generally speaking the prospects of the kharif crops, even in Akola, are not very bad. Indeed, except as regards crops on the high ground and poorer soils, they will, it is anticipated, be good, should the next fortnight bring timely rain. It is of course impossible to say what may be the consequence of an entire absence of rain during the next month.

2. But so far, though distress has set in, it would not appear to be caused by anything like a want of grain, as exportation of grain is still going on, but by high prices and want of work. The failure of forage and brushwood has thrown many people who used to cut and sell grass and wood out of employ; weeding operations are at a stand-still, and thus a number of persons have nothing to do; and cases are reported of several persons who have only one meal in two days. The class chiefly affected are the poorer Mahomedans; but of course when wheat and jowari are selling as at Akola, all persons of small means who depend mainly on these staples for food must suffer.

AKOLA DISTRICT.

Average Prices per Rupee.

	This year.	Former year.
Wheat -	8 seers.	23 seers.
Jowari -	10 „	40 „

3. Some time ago, in view of scarcity, certain works were selected for relief purposes in the event of an influx of persons from the Bombay famine districts rendering it necessary to find employment for them in Berar, and these and others will now be taken in hand as relief works as may be found most convenient.

To provide labour in the Akola district, Sir R. Meade has, on the urgent recommendation of the Commissioner of the assigned districts, sanctioned the commencement of earthwork on a project for water supply at Sheagaon, which is estimated to cost rather more than Rs. 40,000, and which will be duly submitted in the Public Works Department for the approval of the Government of India. The whole sum that has to be subscribed by the people for this work is Rs. 18,435, of which Rs. 10,441 have already been contributed, and the greater part of the balance can, it is believed, be realised without difficulty.

4. To alleviate distress in the Akola district very considerable liberality has been shown by private individuals, and the efforts of the local officers in organising relief measures are both diligent and judicious. At Akola many persons have subscribed to open a store of grain, to be sold at a fixed moderate rate to the poor—an excellent form of charity for all who are not absolutely destitute. To encourage the liberality manifested in this district, the Resident has, on the application of the Deputy Commissioner and Commissioner, sanctioned a grant of Rs. 5,000 from the general revenue of the Province, to be expended under the supervision of the Commissioner, if found absolutely necessary in such way as may be deemed most desirable.

5. The Resident hopes the action taken by him, as noted in paragraphs 3 and 4 of this letter, will be approved by the Government of India.

Encl. in No. 215.

No. 181.

From COLONEL O. T. BURNE to MR. A. C. LYALL.

MY DEAR MR. LYALL, Gunesh Khind, 24th August 1877.

I HAVE laid before the Viceroy your letter of 16th August expressing your fears of severe distress being imminent in Rajpootana. The Maharaja of Jeypore, who was admitted to an interview with his Excellency on Sunday last, also expressed great apprehension on the subject, and laid before Lord Lytton a memorandum of the measures which he proposed to adopt.

It is with great concern that Lord Lytton hears of the probability of this severe distress, which is not only deplorable on its own account, but aggravates grievously the difficulties caused by scarcity in other parts of India. I am directed to forward the Maharaja's memorandum for your consideration, and to give you an outline of the views which Lord Lytton has arrived at on the main point of the memorandum, and which may be communicated to his Highness. You will find, in the accompanying copy of Lord Lytton's Minute of the 12th August, a distinct enunciation of the general principles which, in the Viceroy's opinion, should guide the authorities in dealing with

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the various stages of famine. Applying these principles to the suggestions contained in the Maharaja's memorandum, Lord Lytton would deprecate any very early adoption of a "vigorous" policy. It is necessary to be prepared with schemes of works of permanent public utility, but it is not desirable to open them in the very early days of scarcity. It seems to Lord Lytton that the result of this season's failure ought not *primâ facie* to be felt in anything like an extreme shape for some months to come, in fact, till the kharif crop would in ordinary course have come into the market; and consequently it should not be readily assumed that the people's own resources have failed before that time, nor should the State be called upon to assist before the inability of the people to live on their own resources is apparent.

Then avoiding, as far as possible, the pernicious system of employing people on petty local works near their homes, and the still more pernicious system of giving relief at their homes to any save those who are absolutely helpless and infirm, the Maharaja should be advised to concentrate his efforts, in the first instance, in providing adequate large works of permanent utility to give employment to large numbers from whom a full, or nearly a full, day's work should be exacted, and these works should be placed under careful and strict professional control. If works of irrigation—such as large tanks, holding two years' supply of water—are possible, and are suited to the country, they have a great advantage, not only in offering profitable employment for unskilled labour, but in the facility with which they can be superintended. The question of going on with the railway through Western Rajpootana is one on which Lord Lytton can give no decisive answer till the papers come before him in due course; but if you find any large relief work really and urgently necessary, this line, which has been already sanctioned by the Secretary of State, and for which indeed the permanent way has, I understand, been ordered out, seems to be the sort of work which should be undertaken, though beyond the attraction of some surplus labour, it will not be of much direct use in the Maharaja of Jeypore's famine difficulties. I have sent a copy of your remarks on this head to the Public Works Department.

To come now to the specific proposals of the Maharaja: Lord Lytton rather deprecated the idea of the Durbar making itself in any way responsible for the recovery of loans granted by money-lenders. So far as the credit of the cultivator goes, the money-lender will tide him over the difficulty without any inducement from the State, and if the State creates an artificial credit, by inducing the money-lender to extend his operations, the State practically becomes security for the loan. Now, experience has shown us that, if a loan can at all be recovered from a cultivator, the money-lender is the person who has the greatest facilities for recovering it, and if he cannot do it the State will only be able to do it by ruining him. The same objection perhaps does not apply to the remission of court fees, which is a matter of detail on which the Durbar can best decide for themselves; but any interference with the business of the money-lenders—any State advances at this stage, however disguised—any interference with the usual process of recovering debts, and therefore with the whole fabric of credit—and, above all, any interference with the natural prices of grain, Lord Lytton emphatically condemns as a false and mischievous policy.

The Viceroy has no objection to the suggestion made in proposal No. 2 for exercising great leniency in the collection of revenue.

In regard to No. 3, for the reasons above given, Lord Lytton deprecates any competition by the State with the ordinary business of the money-lender. Where (if anywhere in the world) money-lenders are not, the State would do well to undertake the work only on such terms as to interest as may prevent too ready a resort to its coffers, and may protect the State from loss by bad debts. To the fourth proposal the Viceroy can have no objection in principle. It is a matter of detail which the Durbar can best decide about.

I have already explained his Excellency's views as to the undertaking of works generally, and need not recapitulate them in reference specially to the fifth proposal. The opening of almshouses may become a necessity, and it is as well that the preliminary arrangements should be made; but in Lord Lytton's opinion these should not be opened while the people can support their own poor; nor, when opened, should any be admitted to them, save under stringent tests and checks; it is a matter of extreme difficulty to move people, who have been once fed at an almshouse for nothing, to public works, where they are forced to give labour in return for subsistence.

On proposals 7 and 8 it is scarcely necessary for Lord Lytton to pass an opinion; nor on No. 9. In fact, his Excellency wishes to confine his advice to matters of principle,

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not of detail; and I am to repeat that, in the long run, the Maharaja will find it the more humane and beneficent course to take stringent measures for testing and controlling the issue of alms and gratuitous relief generally; to concentrate all relief labour on large works under professional superintendence, to interfere as little as possible with the business of the money-lender, and give no advances except with an immediate view to the renewal of cultivation.

I am to request that you will convey to the Maharaja Lord Lytton's high appreciation of his humanity and far-sighted consideration of the responsibilities which the threatened distress have thrown upon him. I am to add, that if the Maharaja will communicate with General Kennedy, who has been directing most successfully the measures of relief in Bombay, he will find the rules and tests there introduced of the greatest assistance to him. I enclose copy of a letter addressed by General Kennedy to me on the subject raised in the Maharaja's memorandum.

Yours truly,
(Signed) O. T. BURNE.

No. 182.

Telegram, dated 24th August 1877.

From SECRETARY OF STATE to VICEROY.

Yours to-day.

President's message yesterday asks for 60 additional engines for State railways, which we assume cancels Great Indian Peninsula indent for 100 engines, including 10 ghât engines.

May these 60 be of Great Indian Peninsula type if that construction will expedite delivery?

No. 183.

Telegram, dated Gunneshkhind, 24th August 1877.

From VICEROY to SECRETARY OF STATE.

Famine conference held with Temple and railway officials. Pressing need for additional engine power, Bombay. I urge earliest possible despatch of all five foot six gauge State Railway engines for loan to Peninsula line—extra payment probably necessary for quicker delivery and despatch of each engine when ready. Telegraph probable dates of arrival at Bombay; early receipt of engines important on famine, financial, and commercial grounds. Probably shall be obliged to suspend all general, in favour of famine, traffic, which cannot otherwise reach famine districts. Unless we can formally assure trade that general traffic will be renewed by beginning of next year at least, commercial crisis at Bombay is inevitable. To justify this assurance, engines must be delivered not later than 1st of January, in which case crisis can be averted. Can we reckon on delivery of whole by that period? Please tell me what is present condition of State engines already ordered.

No. 184.

Telegram, dated Gunneshkhind, 25th August 1877.

From VICEROY to SECRETARY OF STATE.

Yours yesterday. It must be distinctly understood that the 60 engines for State Railways are additional to the 40 engines previously ordered. This cancels indent for 100 engines, including 10 ghât engines for Great Indian Peninsula Railway, but has no

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reference to 40 engines under construction for Great Indian Peninsula Company. Your sanction to Dhond-Munmar Railway renders 10 ghât engines unnecessary. All the 60 to be of State Railway type five foot six gauge.

No. 185.

Telegram, dated 27th August 1877.

From SECRETARY OF STATE to PRESIDENT.

Dhond-Munmar Railway. Engine turntables and traverses in store at Kanoo Junction, East Indian. Will they do?

No. 186.

Telegram, dated 27th August 1877.

From GOVERNOR OF BOMBAY to SECRETARY OF STATE.

Since my telegram of the 17th there has been good rain in eastern part of Kattywar, in districts of Surat, Khandesh, and part of Nassik, also showers in parts of Poona, and Sholapur; light rain only in Concan; and one rainstorm in Dharwar. All this constitutes clear improvement in situation in Bombay Presidency, but monsoon still irregular, and distress considerable. Crops far from secure, but may yet be mainly saved if more rain comes.

No. 187.

Telegram, dated Simla, 27th August 1877.

From PRESIDENT to SECRETARY OF STATE.

If wooden sleepers be sent for Dhond-Munmar Railway neither chairs nor keys will be required, but spikes wanted.

No. 188.

Telegram, dated 28th August 1877.

From SECRETARY OF STATE to VICEROY.

Yours 25th.

Will order at once 60 engines, State Railway type, but wish you distinctly to understand that this will probably involve considerable delay, as engines of Great Indian Peninsula type could be delivered more rapidly.

No. 189.

Telegram, dated 28th August 1877.

From SECRETARY OF STATE to VICEROY.

Yours 23rd.

If waggons wanted 500 can be delivered here in ten weeks from date of order; cost about 150*l.* per waggon in India.

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No. 190.

Telegram, dated 28th August 1877.

From SECRETARY OF STATE to PRESIDENT, Simla.

Yours 27th.
Sleepers for Dhond-Munmar ordered. Firms at work.

Encl. in No. 289.

No. 191.

EXTRACT from the Proceedings of the BOARD OF REVENUE, Madras, No. 3,989, dated 28th August 1877.

READ again—

G. O., dated 3rd August 1877, No. 2,441, recorded in Board's proceedings, dated 13th August 1877, No. 3,778.

p. 153. The accompanying demand, collection, and balance statement of land revenue as compared with the average of the past three Faslis is submitted to Government, with reference to the requisition contained in the telegram of the Government of India embodied in the Government order read above. The particulars are given for the Fasli year ending 30th June 1877 as the demand is fixed for that period.

2. The demand shown in the statement for Fasli 1286 is only approximate, as the jamabundy has not yet been completed in all the districts.

No. 192.

Telegram, dated Madras, 29th August 1877.

From VICEROY to SECRETARY OF STATE.

Your telegram, 28th. Early arrival of engines most important. If four weeks saved in time of delivery by adoption of Peninsula type, please order 30 engines of that type for Company, and 30 of State Railway type for reserve. Please telegraph progress of 40 engines for State previously ordered, and probable date of arrival.

Encl. in No. 215.

No. 193.

No. 755, dated Madras, 29th August 1877.

From C. BERNARD, Esq., C.S.I., Additional Secretary to the Government of India, to the RESIDENT AT HYDERABAD.

Your letter, No. 8-B., dated the 23rd August, regarding anticipated distress in the Akola District of Berar, has been laid before his Excellency the Viceroy, who has (since the receipt of your letter) been glad to learn from yourself that good rain has fallen in Berar, and that the crops thus far promise well.

2. But, in the event of difficulties recurring, I am to explain his Excellency the Viceroy's views to the following effect. Though there may be some distress among the poor, yet it is to be hoped that general distress would not be felt in a rich province like Berar, so early in the season as August, after a good harvest last year, and at prices not dearer than 10 seers the rupee. Until real distress becomes felt among a considerable section of the population it is generally undesirable to open relief works or to begin relief measures. Paragraphs 19 and 20 of the enclosed Minute by the Viceroy express his Excellency's views as to the way in which relief employment ought to be prepared and given. If, or when, distress threatens in Berar, no time should be lost in preparing projects for large useful works; and when necessity arises, such works should be opened under strict professional supervision. If at centres of population, like Akola or Sheagaon, relief employment is required before general distress declares itself, such employment should be given under stringent professional supervision, and the wage-rate should be kept very low.

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No. 194.

Encl. in No. 215.

No. 756, dated 29th August 1877.

From the SECRETARY TO THE GOVERNMENT OF INDIA, Department of Revenue, Agriculture, and Commerce, to the SECRETARY TO THE GOVERNMENT, North-West Provinces.

I am directed to acknowledge the receipt of your letter, No. 1,754, dated 22nd August, with enclosures, concerning the effects of the recent drought on the autumn crop of the North-Western Provinces. The present condition appears to be in brief that the unirrigated autumn crop has already been lost over a great part of the Meerut, Agra, Jhansi, and Rohilcund Divisions, as well as over the greater part of Oudh; that the autumn crops of the Benares and Allahabad Divisions are in a critical state; and that even the irrigated crops have suffered much from the hot dry winds. No. 169.

2. His Excellency the Viceroy is much concerned to learn that already the loss of crop in the North-Western Provinces should have been so great. Telegrams received from the Secretariat at Allahabad since the date of your letter (22nd August) show that rain still holds off everywhere, save in the Benares Division. It is satisfactory that the reports now received confirm the general impression that, notwithstanding the large exportation of the past season, the food stocks in the hands of landholders and dealers are unusually large.

3. His Excellency the Viceroy has been much interested in reading Colonel Fraser's letter, which conveys his Honour the Lieutenant-Governor's views to the Commissioners and Collectors; and he thoroughly approves the warning against undue alarm. Your seventh paragraph mentions that authority has already been given to all Commissioners to begin at once giving relief employment on public works of Class A., that is to say, on repairs to main roads, on collecting metal, on improving cross-roads, on repairs to canals, tanks, and drainage works. If this authority does no more than permit Commissioners to begin earlier than usual the ordinary works of this class, for which funds are provided in the local or provincial budgets, then the Viceroy will not interfere with the discretion of the local Government; though his Excellency advises that the relief wage on such works be fixed at the lowest subsistence rate, and that full professional supervision be exercised over such works from the very first.

4. If, however, the authority spoken of in your seventh paragraph permits Commissioners to begin at discretion famine relief works of the type described under Class A. of Colonel Fraser's letter, and if the request for sanction, made in your ninth paragraph, imports that the cost of these works is to be charged as famine expenditure against the Government of India, then his Excellency the Viceroy must request that the matter may be reconsidered. His Excellency's most decided opinion—that opinion is confirmed by the experience of the past year—is that at the very beginning of a scarcity relief employment should be given on large, professionally supervised public works only, and that no relief policy can be financially more dangerous than to open all over the country scattered relief works on which adequate supervision must be practically impossible. Lord Lytton's views on this subject—views in which his Excellency's colleagues fully concur—will be found in the annexed extracts from a Minute recorded by him on the present condition of famine affairs in Southern India.

5. In accordance with the views expressed in the extracts in question the Government of India must request that, if relief employment is given at the cost of the general treasury in any part of the North-Western Provinces, such employment shall from the outset be given on large public works and under professional supervision only. His Excellency the Viceroy believes that the North-Western Provinces and Oudh Government already possesses many* great and useful projects, which, though hitherto postponed on financial grounds, would be of permanent benefit to the country, and might fitly be selected for execution either wholly or in part, in the event of a heavy expenditure, as famine relief becoming necessary. His Excellency therefore requests that some such work may be selected for each district or division, as the first relief work to be opened in each tract. All persons requiring relief employment would then be sent to, and employed on, large, adequately supervised undertakings of permanent utility.

* For instance—
The Ganges Canal improvement.
The Lower Ganges Canal (Rajunpore) Scheme.
The Sarda Canal Project.
The Rohilcund Canals.
Branch railways in Oudh, Rohilcund, and parts of North-Western Provinces.

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No. 195.

Telegram, dated 30th August 1877.

From VICEROY to SECRETARY OF STATE.

20th to 28th, Madras. Insufficient rain in Kistna, Northern Circars, Bellary, North Arcot, Kurnool, Cuddapah; light showers elsewhere. Rainfall not general. Situation not improved anywhere; distinctly worse in Madura, Salem, Coimbatore, Nellore; prices high; supplies from seaboard sufficient. Double line open. Arconum railway working from Madras improving; Raichore supplies short.

Numbers on works, 919,771; on gratuitous relief, 1,326,971. Many people left works for village relief.

In Mysore, crop prospects worse; showers less frequent; prices dear as before; 49,200 on works; 194,083 on gratuitous.

Bombay, plentiful rain in Khandesh, good general rain in Tanna, Kolaba, Broach, Surat, Nassik, in greater part Kattywar, parts Ahmednagar, Belgaum; showers in Dharwar, Sattara, Sholapore, part of Kaladgi, some places in Guzerat. Prices very dear. Deccan crop prospects on whole better; number on relief, as before. North-West autumn crop nearly lost in Agra, Mirut, Jhansi, Rohilkund Divisions; greater part Oudh crop on irrigated land suffering from hot wind, no rain. Telegram to-day says, good general rain in Meerut and Rohilcund will do much good. Crops in Allahabad, Benares Divisions critical.

Punjaub, condition of crops critical. In South Bengal, Burmah, Central Provinces, crop prospects good; also in Berar, where recent rain. Central India, good rain at Indore. Rutlam, much benefited. Gwalior, no rain, prospects bad. Rajputana, no appreciable rainfall, failure crops and pasturage expected. Hyderabad no rain, much failure and distress reported south of Nizam's dominions.

No. 196.

Telegram, dated Madras, 30th August 1877.

From VICEROY to SECRETARY OF STATE.

Have inquired into Madras Railway requirements and recent indent on your Lordship. I consider that 20 locomotives, 600 waggons, and 40 break-vans should be despatched promptly. Locomotives should form part of State reserve, and should be of State Railway five feet six inch gauge type. Molesworth wishes additional quarter inch thickness of engine framing. We will accept engines of Madras Railway type, as designed by Madras Locomotive Superintendent, if these can arrive sooner, but we object to engines of type recently received in Madras. Waggons to be of State Railway type to carry 10 tons, break-vans of type indented by Madras.

No. 197.

Telegram, dated 31st August 1877.

From SECRETARY OF STATE to PRESIDENT, Simla.

Yours, 14th. Western Rajputana Railway.

Railway materials and rolling stock for 100 miles will be provided at once as stock.

Encl. in No. 289.

No. 198.

No. 2,619, dated Fort St. George, 31st August 1877.

From ADDITIONAL SECRETARY TO THE GOVERNMENT OF MADRAS to ADDITIONAL SECRETARY TO THE GOVERNMENT of INDIA.

With reference to the telegram from the Honourable T. C. Hope, dated 31st July 1877, and in continuation of my letter No. 2,511 C., dated the 16th instant, I am directed to submit, for the information of his Excellency the Governor-General in Council, a statement prepared by the Madras Board of Revenue showing the approximate demand, collection, and balance of land revenue for Fasli (revenue year) 1,286 compared with the average of the preceding three years.

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Statement showing the Approximate Demand, Collection, and Balance of Land Revenue for Fasli 1286 compared with the average of the preceding Three Years.

Districts.	Demand, Collection, and Balance on the average of three years ending 30th June 1876.											
	Land Revenue Demand.			Land Revenue Collections and Remissions.								
				Collections.			Remissions.			Total.		
	Arrears.	Current.	Total.	Arrears.	Current.	Total.	Arrears.	Current.	Total.	Arrears.	Current.	Total.
1.	2	3	4	5	6	7	8	9	10	11	12	13
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1. Ganjam - -	2,17,437	11,92,778	14,10,215	1,72,649	10,47,354	12,20,003	1,043	- - -	1,043	1,73,692	10,47,354	12,21,046
2. Vizagapatam - -	81,153	13,91,044	14,72,197	65,212	13,28,436	13,93,648	1,617	- - -	1,617	66,829	13,28,436	13,95,265
3. Godavery - -	4,70,952	42,07,153	46,78,105	2,14,714	39,83,987	41,98,701	12,412	- - -	12,412	2,27,126	39,83,987	42,11,113
4. Kistna - -	2,51,204	40,60,486	43,11,690	1,76,226	38,31,412	40,07,638	10,858	- - -	10,858	1,87,084	38,31,412	40,18,496
5. Nellore - -	6,00,001	22,41,078	28,41,079	4,37,103	16,89,430	21,26,533	14,668	- - -	14,668	4,51,771	16,89,430	21,41,201
6. Cuddapah - -	2,66,550	18,89,986	21,56,536	2,18,636	17,07,109	19,25,745	6,369	- - -	6,369	2,25,005	17,07,109	19,32,114
7. Bellary - -	1,02,023	24,82,798	25,84,821	67,244	23,87,382	24,54,626	11,876	- - -	11,876	79,120	23,87,382	24,66,502
8. Kurnool - -	35,744	14,97,668	15,33,412	26,922	14,66,373	14,93,295	1,339	- - -	1,339	28,261	14,66,373	14,94,634
9. Madras - -	42,386	78,375	1,20,761	19,307	67,643	86,950	5,413	35	5,448	24,720	67,678	92,398
10. Chingleput - -	5,78,070	14,38,176	20,16,246	3,83,642	11,71,728	15,55,370	15,512	- - -	15,512	3,99,154	11,71,728	15,70,882
11. North Arcot - -	5,04,127	24,02,118	29,06,245	3,32,681	21,14,143	24,46,824	17,644	3,000	20,644	3,50,325	21,17,143	24,67,468
12. South Arcot - -	2,62,006	31,41,104	34,03,110	2,01,505	27,81,922	29,83,427	19,219	- - -	19,219	2,20,724	27,81,922	30,02,646
13. Tanjore - -	1,71,374	41,94,530	43,65,904	1,38,350	40,40,644	41,78,904	1,710	- - -	1,710	1,40,060	40,40,644	41,80,704
14. Trichinopoly - -	1,12,277	15,09,111	16,21,388	86,616	14,25,789	15,12,405	1,849	- - -	1,849	88,465	14,25,789	15,14,254
15. Madura - -	13,23,765	24,09,095	37,32,860	10,27,719	16,44,579	26,72,298	3,044	275	3,319	10,30,763	16,44,864	26,75,617
16. Tinnevelly - -	3,81,238	28,20,474	32,01,712	3,54,270	24,28,929	27,83,199	9,133	- - -	9,133	3,63,403	24,28,929	27,92,332
17. Coimbatore - -	1,92,537	26,02,893	27,95,430	1,75,800	23,81,621	25,57,421	1,606	- - -	1,606	1,77,406	23,81,621	25,50,027
18. Nilgiris - -	1,942	45,165	47,107	423	41,849	42,272	1,109	- - -	1,109	1,532	41,849	43,381
19. Salem - -	3,56,459	22,35,189	25,91,641	2,28,837	19,58,426	21,87,263	28,305	- - -	28,305	2,57,142	19,58,426	22,15,568
20. South Canara - -	56,244	12,74,683	13,30,927	47,612	12,11,997	12,59,609	762	- - -	762	48,374	12,11,997	12,60,371
21. Malabar - -	1,11,678	18,43,000	19,54,678	49,947	17,74,630	18,24,577	4,791	- - -	4,791	54,738	17,74,630	18,29,368
Total - -	61,19,167	4,49,56,904	5,10,76,071	44,25,415	4,04,85,383	4,49,10,798	1,70,279	3,310	1,73,589	45,95,694	4,04,88,693	4,50,84,387

(continued.)

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STATEMENT showing the APPROXIMATE DEMAND, COLLECTION, and BALANCE OF LAND REVENUE for FASLI 1286, &c.—(*continued*).

DISTRICTS.	DEMAND, COLLECTION, AND BALANCE ON THE AVERAGE OF THREE YEARS ENDING 30TH JUNE 1876—*continued*.				DEMAND, COLLECTION, AND BALANCE OF FASLI 1286 ENDING 30TH JUNE 1877.					
	LAND REVENUE BALANCE.			Per-centage of the Balance to the Demand.	LAND REVENUE DEMAND.			LAND REVENUE COLLECTIONS AND REMISSIONS. Collections.		
	Arrears.	Current.	Total.		Arrears.	Current.	Total.	Arrears.	Current.	Total.
1.	14	15	16	17	18	19	20	21	22	23
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1. Ganjam	43,745	1,45,424	1,89,169	13·4	1,64,919	11,88,658	13,53,577	1,03,431	10,95,651	11,99,082
2. Vizagapatam	14,324	62,608	76,932	5·2	80,917	13,83,805	14,64,722	65,313	12,90,185	13,55,498
3. Godavery	2,43,826	2,23,166	4,66,992	10·0	4,52,159	41,71,301	46,23,460	1,77,746	40,36,723	42,14,469
4. Kistna	64,120	2,29,074	2,93,194	6·8	2,87,052	35,97,935	38,84,987	1,38,163	29,14,896	30,53,059
5. Nellore	1,48,230	5,51,648	6,99,878	24·6	7,46,482	9,98,879	17,45,361	4,41,943	4,21,529	8,63,472
6. Cuddapah	41,545	1,82,877	2,24,422	10·4	1,76,973	7,55,500	9,32,473	1,01,539	1,32,482	2,34,021
7. Bellary	22,903	95,416	1,18,319	4·6	1,45,354	8,00,000	9,45,354	79,278	2,18,393	2,97,671
8. Kurnool	7,483	31,295	38,778	2·5	34,428	7,06,167	7,40,595	19,814	78,506	98,320
9. Madras	17,666	10,697	28,363	23·5	24,013	78,014	1,02,027	8,250	64,103	72,353
10. Chingleput	1,78,916	2,66,448	4,45,364	22·1	3,64,942	6,13,000	9,77,942	1,69,774	1,83,446	3,53,220
11. North Arcot	1,53,802	2,84,975	4,38,777	15·1	4,32,028	15,61,000	19,93,028	1,73,961	5,41,777	7,15,738
12. South Arcot	41,282	3,59,182	4,00,464	11·8	5,52,476	26,00,000	31,52,476	5,00,836	15,11,505	20,12,341
13. Tanjore	31,314	1,53,886	1,85,200	4·2	2,08,144	40,19,068	42,27,212	1,66,678	36,77,421	38,44,099
14. Trichinopoly	23,812	83,322	1,07,134	6·6	77,823	14,67,592	15,45,415	52,155	13,21,171	13,73,326
15. Madura	2,93,002	7,64,241	10,57,243	28·3	5,57,147	18,09,198	23,66,345	4,93,647	2,74,383	7,68,030
16. Tinnevelly	17,835	3,91,545	4,09,380	12·8	4,39,671	24,25,884	28,65,555	4,15,743	18,54,771	22,70,514
17. Coimbatore	15,131	2,21,272	2,36,403	8·5	2,53,479	23,11,428	25,64,907	2,22,557	10,17,509	12,40,066
18. Nilgiris	410	3,316	3,726	7·9	9,025	56,527	65,552	8,151	45,380	53,531
19. Salem	99,317	2,76,763	3,76,080	14·5	4,15,327	18,20,709	22,36,036	2,42,504	4,46,738	6,89,242
20. South Canara	7,870	62,686	70,556	5·3	90,715	12,95,294	13,86,009	81,010	12,23,792	13,04,802
21. Malabar	56,940	68,370	1,25,310	6·4	1,44,182	18,24,732	19,68,914	63,700	17,69,521	18,33,221
Total	15,23,473	44,68,211	59,91,684	11·7	56,57,256	3,54,84,691	4,11,41,947	37,26,193	2,41,19,882	2,78,46,075

(*continued*.)

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STATEMENT showing the APPROXIMATE DEMAND, COLLECTION, and BALANCE OF LAND REVENUE for FASLI 1286, &c.—(*concluded*).

DISTRICTS.	DEMAND, COLLECTION, AND BALANCE OF FASLI 1286 ENDING 30TH JUNE 1877—(*continued*).									Per-centage of the Balance to the Demand.
	LAND REVENUE COLLECTIONS AND REMISSIONS—(*continued*).						LAND REVENUE BALANCE.			
	Remissions.			Total.						
	Arrears.	Current.	Total.	Arrears.	Current.	Total.	Arrears.	Current.	Total.	
1.	24	25	26	27	28	29	30	31	32	33
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
1. Ganjam	6,798	- - -	6,798	1,10,229	10,95,651	12,05,880	54,690	93,007	1,47,697	10·9
2. Vizagapatam	3,687	- - -	3,687	69,000	12,90,185	13,59,185	11,917	93,620	1,05,537	7·2
3. Godavery	59,402	- - -	59,402	2,37,148	40,36,723	42,73,871	2,15,011	1,34,578	3,49,589	7·5
4. Kistna	8,294	- - -	8,294	1,46,457	29,14,896	30,61,353	1,40,595	6,83,039	8,23,634	21·2
5. Nellore	72,064	- - -	72,064	5,14,007	4,21,529	9,35,536	2,32,475	5,77,350	8,09,825	46·4
6. Cuddapah	3,496	- - -	3,496	1,05,035	1,32,482	2,37,517	71,938	6,23,018	6,94,956	74·5
7. Bellary	8,035	- - -	8,035	87,313	2,18,393	3,05,706	58,041	5,81,607	6,39,648	67·7
8. Kurnool	3,778	- - -	3,778	23,592	78,506	1,02,098	10,836	6,27,661	6,38,497	86·2
9. Madras	2,609	- - -	2,609	10,859	64,103	74,962	13,154	13,911	27,065	26·5
10. Chingleput	43,664	- - -	43,664	2,13,438	1,83,446	3,96,884	1,51,504	4,29,554	5,81,058	59·5
11. North Arcot	18,063	- - -	18,063	1,92,024	5,41,777	7,33,801	2,40,004	10,19,223	12,59,227	63·2
12. South Arcot	7,144	- - -	7,144	5,07,980	15,11,505	20,19,485	44,496	10,88,495	11,32,991	35·9
13. Tanjore	1,380	- - -	1,380	1,68,058	36,77,421	38,45,479	40,086	3,41,647	3,81,733	9·0
14. Trichinopoly	5,992	- - -	5,992	58,147	13,21,171	13,79,318	19,676	1,46,421	1,66,097	10·7
15. Madura	1,158	- - -	1,158	4,94,805	2,74,383	7,69,188	62,342	15,34,815	15,97,157	60·7
16. Tinnevelly	1,975	- - -	1,975	4,17,718	18,54,771	22,72,489	21,953	5,71,113	5,93,066	20·7
17. Coimbatore	5,519	- - -	5,519	2,28,076	10,17,509	12,45,585	25,403	12,93,919	13,19,322	53·5
18. Nilgiris	- - -	- - -	- - -	8,151	45,380	53,531	874	11,147	12,021	18·3
19. Salem	17,310	- - -	17,310	2,59,814	4,46,738	7,06,552	1,55,513	13,73,971	15,29,484	68·4
20. South Canara	80	- - -	80	81,090	12,23,792	13,04,882	9,625	71,502	81,127	5·9
21. Malabar	11,742	- - -	11,742	75,442	17,69,521	18,44,963	68,740	55,211	1,23,951	6·3
Total	2,82,190	- - -	2,82,190	40,08,383	2,41,19,882	2,81,28,265	16,48,873	1,13,64,809	1,30,13,682	31·6

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Encl. in Nos. 215, 253.

No. 199.

No. 772—(Famine).

From the Additional Secretary to the Government of India to the Secretary to the Government of Bengal.

Governor-General's Camp, Madras, the 31st August 1877.

The attention of his Excellency the Viceroy has been drawn to certain correspondence which has passed between the Lord Mayor of London and the General Committee, Madras Famine Relief Fund, in regard to a private meeting held in Calcutta for forming a Famine Relief Committee; and from this correspondence it appears that considerable misapprehension exists as to his Excellency's views on the subject of appeals to the public in aid of famine relief. I am, therefore, directed to communicate to you, in continuation of the Viceroy's telegram of the 12th August, the views of the Government of India on this important subject.

2. The Madras Government have undertaken to keep people alive by all available means within their power; they undertake to relieve the famine-stricken by giving work to those who can work; by giving food and attendance either in relief camps or kitchens to famine-stricken people who cannot work, and they distribute relief in the shape of a money-dole to nearly half a million of people at their villages; but in order to do this the whole available organisation of the country is strained to the very utmost, and it is impossible to place the organisation at the disposal of any irresponsible committee.

3. Before, therefore, the Government of India could properly ask for, or even accept, the charitable assistance of the public, it would be necessary to ascertain what measures of relief, other than those already adopted by Government, the Central Committee propose to adopt, and what organisation, other than the Government organisation, is at their disposal for carrying out those measures.

4. The Viceroy in his telegram of the 12th explained that he was unwilling "to "appeal for public subscriptions in aid of the efforts which Government was making to "keep people alive," that is to say, he was unwilling to ask for public subscriptions in order to supplement the Government expenditure on the same lines, for the same ends, and through the same channels of organisation as the Government had already occupied. To have done this would be merely asking for public subscriptions in aid of the Indian revenues, and it was unlikely on the one hand that the public would have cared to subscribe for this purpose, while on the other the assistance which such subscriptions could have given would have borne but an infinitesimal proportion to the expenditure of half a million sterling a month which the Government has already to defray on account of famine.

5. There was another consideration which, in his Excellency's opinion, rendered it specially inopportune to appeal to the Indian public for subscriptions in aid of Imperial expenditure on famine, so long especially as the objects and agency of such charity are not distinctly and definitely separated from the objects and agency of Government expenditure. It had become manifest that, in order to meet the heavy drain on the finances of India, which the Madras and Bombay famines were already causing, the Government would sooner or later be obliged to resort to increased taxation over the whole country, and it followed necessarily from the nature of the case that the very class from whom subscriptions might be expected would have to bear the burthen of taxation; the Viceroy was, therefore, unwilling to ask for public subscriptions from the same persons, who would hereafter have to bear a heavy burthen of taxation for precisely the same objects as those to which their subscriptions were to be devoted.

6. This last consideration of course applies only to subscriptions raised in India, and in no way to appeals made in England; but its importance is increased by the fact that, in addition to the destitution in Madras, the Government have to face anticipated scarcity also over a great portion of Northern India.

7. His Excellency in his telegram of the 12th instant added that "if any definite "objects can be specified which are beyond the scope of the operations of Government, "and to which the subscriptions of the public can be usefully applied, there can be no "objection." At that time the Government of India had received no communication

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on the subject from the Government of Madras, and the newspaper reports of the public meetings left it quite uncertain whether the objects to which the Committee destined their funds were those already provided for by Government or not; in fact, the telegram ultimately sent home by the Committee to the Lord Mayor leaves the question still open to the utmost doubt, and points rather to the assistance being devoted to relief works and relief camps than to any fresh field of action. His Excellency has now, however, had an opportunity of conferring with the Government of Madras, and learns from his Grace the Duke of Buckingham that the Committee propose to devote the funds received by them to special objects not coming within the scope of Government relief, two of which objects are understood to be the relief of those who are not yet so reduced as to leave their villages or to apply for Government assistance, and the support of orphans and destitute children not reached by Government agency. His Excellency is now in correspondence with the Government of Madras with a view to formulating somewhat more precisely the objects to which private charity will be devoted and the agency through which it will be applied.

"Committee earnestly solicit your Lordship's powerful influence, support, appeal, assistance, for afflicted population Southern India * * * Property sold for food; villages largely deserted; poor wandering search sustenance; resources lower middle class exhausted owing famine prices; prompt liberal assistance sympathy may mitigate suffering."

8. While, therefore, it remains in the Viceroy's opinion undesirable for the Government itself to ask those who will hereafter have to bear the burden of taxation on account of famine expenditure to give their private subscriptions also towards the same object, his Excellency desires that every encouragement may be given to spontaneous efforts which may be made in this direction. Lord Lytton is very far from desiring to impede the flow of private charity, and is only anxious to secure that it should be devoted to useful purposes apart from those already taken up by the State, and that it should not be diverted into a simple contribution to the revenues of the State.

No. 200.

Encl. in Nos. 215, 253.

No. 773—(Famine).

From the Additional Secretary to the Government of India to the Secretary to the Government of Madras, Famine Department.

Governor-General's Camp, Madras,
31st August 1877.

I am directed to forward, for the information of the Governor of Madras in Council, the accompanying copy of a letter which, under the direction of his Excellency the Viceroy, I have this day addressed to the Government of Bengal, in regard to the question of applying to the public for subscriptions in aid of famine relief.

2. The immediate object of this letter was to explain to his Honour the Lieutenant-Governor of Bengal somewhat more fully than had been done in the telegram of the 12th of August the views and wishes of the Government of India in regard to appeals by Government for public subscriptions, and it is desirable that his Grace should also be informed of the considerations which led his Excellency to adopt these views.

3. With reference to paragraph 7 of the enclosed letter, I am directed to state that his Excellency finds on the proceedings of the Committee* held on the 24th August, a resolution that the Fund should be devoted (1) to contributions in aid of local Committees for the relief of necessitous poor, not reached by the Government; (2) to contributions towards the care of destitute children; (3) to making allotment towards any other special objects which seem to come within the scope and ability of the Fund. The whole discussion tends to show that it was the desire of the Committee to adapt its work to objects and measures of relief other than those already covered by the action of Government, but in considering the terms by which the Committee define the objects to which their funds will be devoted the Viceroy fails to gather such complete and specific information on the point as he could desire. He has no objection whatever to the benefits of private charity being directed towards those necessitous poor whom the action of Government cannot reach, and accepts it as quite probable that among women of respectable classes, among persons on very small fixed incomes, and even among agriculturists who are struggling to remain at their homes, there may be cases which ought not to come within the scope of Government action, but which may very properly be relieved by private charity wherever private charity has the necessary agency at its disposal. Similarly, in regard to children, though Government is in one

* General Committee, Madras Famine Relief Fund.

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way or another endeavouring to keep alive all destitute or orphan children that may be thrown on its hands, there may well be room for private charity in regard to children not within this category, and moreover the work of providing for and supporting such children hereafter, either by grants to orphanages or to those who will receive such children, is obviously a fit subject for private charity. His Excellency understands that it was not the object of the Committee to express, in a general resolution, specific rules or detailed instructions, but doubtless these will be drawn out hereafter. In the meantime, as Lord Lytton learns that the subject has been under the consideration of his Grace the Governor, he will be glad to receive information as to the conclusions which the Madras Government have come to, and to learn not only what are the specific objects in detail to which funds are to be devoted, but also what agency the Committee propose to employ, both in large towns and in the interior, for the attainment of those objects. In large towns there will, no doubt, be plenty of volunteer agency available, but in the villages his Excellency apprehends that outside the chain of relief organization subordinate to the Collector it will be difficult to find the requisite agency, and Lord Lytton deprecates the diversion of this organization to purposes other than those of Government relief. This objection is not based on imaginary grounds. Experience has shown that, when the Government relief organization has been placed under the orders of a Central Committee, it has led not only to the Collectors being burdened with additional work, having to submit double sets of returns, and to correspond with an additional master, but also to a considerable amount of friction and some unseemly discussions between Government officials and their superiors. His Excellency hopes, therefore, that the Government of Madras will be able to direct the operations of the Committee into some line where the agency to be employed will not be that of the overworked establishment already employed by Government.

Encl. in No. 216.

No. 201.

ADMINISTRATIVE ARRANGEMENTS.

No. 2,232, dated Fort St. George, 31st August 1877.

From the Honourable D. F. CARMICHAEL, Chief Secretary to Government, Madras, to C. BERNARD, ESQ., C.S.I., Additional Secretary to the Government of India.

His Grace the Governor having had the advantage of a conference with his Excellency the Viceroy respecting the control of future famine operations in this Presidency, I am directed to report, for the information of the Government of India, the steps which the Madras Government has decided to take, and the respects in which his Grace the Governor in Council desires the assistance of his Excellency the Viceroy of India.

2. In the first place his Grace the Governor has resolved to frame a rule under section 28 of the "Indian Councils Act," providing that all famine questions coming before the Government of Madras shall be laid before his Grace the Governor, and disposed of by him. Orders issued under this rule will thus have the force of orders of the Governor in Council.

3. Next, it has been decided that to his Grace the Governor shall be attached a high officer, possessing the confidence of the Government of India, who shall be a personal assistant to the Governor in famine management.

4. The Chief Engineers in all departments, the Collectors of districts, and other controlling officers engaged in famine management, will be instructed to address, for the future, all their references and reports to Government on famine matters (including relief works) to the Additional Secretary in the Revenue Department direct, and not through the Board of Revenue. Such reports, and the orders passed by Government thereon, will be communicated in the ordinary course to the Board, in order that the Board may be kept fully informed of all that passes, and that its members may be competent to advise the Government whenever their aid may be asked. If the work thus thrown on the Secretariat should prove excessive, his Excellency the Viceroy will, the Governor understands, be willing to sanction an additional Under Secretary or other requisite staff in the Government Famine Department.

5. His Grace the Governor proposes that members of the Board should be deputed, as heretofore, to visit the distressed districts, inspect relief operations, and report to Government the manner in which orders are being carried out.

6. His Grace the Governor was glad to find that his Excellency the Viceroy is in accord with himself as to the main principles which ought to guide the famine policy of

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Government; but it seems advisable that these principles should be briefly recapitulated here. They are,—

I. *Grain-Supply.*—That, as was decided by the Government of India at Delhi in January last, this Government should abstain from importing grain on its own account, and from any measure which might interfere with the activity of private trade. As the proposal to supply seed-grain to ryots might be held to traverse this general rule, it was noted at the conference that the Government of Madras would be free to buy a supply of such seed-grain if his Grace found such an arrangement better than advancing to ryots money for the purchase of seed.

II. *Public Works.*—A large scheme of useful public works under departmental supervision should be the backbone of the relief system; all other forms of relief being subsidiary to the main scheme, and all relief-works of any magnitude being directed and controlled by agency belonging to the Public Works Department.

Large works under professional agency should not be limited (as has under standing orders been hitherto the case) to works which are deemed directly remunerative, nor even to works which may probably be finished during the continuance of the famine. The Governments of India and Madras will be prepared to accept a proportion of unremunerative and unfinished public works at the end of the famine.

III. *Gratuitous Relief.*—All gratuitous relief should be, as far as possible, temporary, and subsidiary to the main object of getting the distressed people on to the works, or back to their homes and ordinary occupations. It will be necessary to maintain relief-camps in order to receive and support the starving, the helpless wanderers, and infirm persons, with a view of getting them into condition to labour. But the ultimate object of these relief-camps as receiving places only for people hereafter to be drafted to works, or to their homes, should ever be kept in view.

Secondly.—Village relief, other than casual relief to famine-stricken travellers, should be confined to resident villagers who are house-ridden, or otherwise unfitted for or incapable of labour.

7. In order to give effect to these principles, his Grace the Governor desires a very considerable temporary addition,

(*a.*) To the engineering staff of the Presidency;

(*b.*) To the European staff for the supervision of gratuitous relief.

His Grace the Governor would ask the Viceroy to lend him from other parts of India,

(*a.*) ten 1st or 2nd Grade Executive Engineers, ten 3rd or 4th Grade Executive Engineers, twenty Assistant Engineers of not less than one year's standing, twenty Upper Subordinates of the higher class;

(*b.*) one hundred active young European officers belonging to one or other of the following classes:—

Staff Corps, Artillery, or other Military Officers not more than 35 years of age.
Assistant, or Acting Assistant Superintendents of Police.
European Inspectors of Police of the better class.
Assistants in the Forest Department of not less than 18 months' service.
Assistants from the Engineering Department of the railways.

The extra allowances to be granted to these officers will be governed by the rules already in force regarding officers deputed for famine duty from other Presidencies.

8. For the due control and direction of relief-works, it will be necessary that the two Chief Engineers now serving under this Government should from time to time be deputed into the interior. And his Grace learns that the Government of India is willing to sanction a third (temporary) Chief Engineer, in the event of such an additional officer being wanted. If his Grace finds it necessary to establish temporarily additional district engineerships on the footing of Superintending Engineership in Bengal, he understands that such temporary appointments will, within moderate limits, be sanctioned.

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Encl. in No. 216.

No. 202.

No. 775, Governor-General's Camp, Madras, the 31st August 1877.

From C. BERNARD, Esq., C.S.I., Additional Secretary to the Government of India, Revenue, Agriculture, and Commerce Department, to the CHIEF SECRETARY TO THE GOVERNMENT OF MADRAS.

I am directed to acknowledge the receipt of your letter, No. 2,232, of to-day's date, describing the measures which the Government of Madras, in pursuance of the conclusions arrived at in the conference held yesterday between the Viceroy and the Governor, proposes to adopt in order to secure promptitude of action and unity of control in famine administration, now that a second failure of the rains has greatly aggravated the pressure of distress throughout the Madras Presidency.

2. The Viceroy is greatly pleased to find that the Government of Madras has decided that the Famine Department shall be under the immediate guidance and control of the Governor; and that some shortening of the administrative chain has been found possible. The Viceroy believes that much benefit to the afflicted populations, in whose behalf his Grace has done so much, as well as great financial advantage to the public treasury, cannot fail to result from the increased efficiency of action and the improved unity of control which will be secured by the arrangements now made.

3. The Viceroy and Governor-General highly appreciates the motives which, in recognition of the great imperial interests concerned, have induced the Governor of Madras to associate with his personal administration, in the manner indicated in paragraph 3 of your letter, the services of an officer possessing the special confidence of the Government of India. I am, however, to point out that it is essential to the efficiency of this arrangement that all famine papers and questions submitted to the Government shall pass though the hands of the personal assistant, as was settled at the conference above referred to. It is, of course, by no means suggested, nor is it at all desirable, that any obstacle should be placed in the way of the personal relations of the Secretariat with and access to the Governor of Madras. But it is absolutely necessary that the personal assistant to the Governor, accredited as he is by the Government of India, should have full opportunity of stating his views to the Governor at the proper time.

4. The Viceroy and Governor-General, in accordance with the proposal formulated in your letter, and after due consultation with the Duke of Buckingham, is hereby pleased to attach temporarily to the Government of Madras, in the capacity of personal assistant to his Grace in famine matters, the Honourable Major-General Kennedy, R.E., who possesses the full confidence of the Government of India.

5. It is a source of much satisfaction to the Viceroy and Governor-General that the recent conference between himself and the Governor of Madras has established complete accordance in their views as regards the general principles of famine management, and the special measures best fitted for the application of those principles to the pressing difficulties, which now call for prompt and decisive action. I am to take this opportunity of forwarding a Minute (already communicated privately to his Grace) which was recorded by the Viceroy prior to his departure from Simla. This Minute will now be circulated to local Governments for their guidance in the administration of famine relief.

6. With reference to the clause in paragraph 6 of your letter, which touches on the possibility that seed-grain may have to be bought by Government for distribution to ryots, the Viceroy understands that, in those rare and special cases, where such purchases may be necessary, they will be made in the local markets, and that seed-grain will not be imported by Government from a distance.

7. His Excellency the Viceroy fully appreciates the importance of not detaining the people from their customary home avocations whenever the revival of agriculture shall have enabled them to resume those avocations without further dependence on State aid. But with reference to clause iii. of your sixth paragraph, I am instructed to point out, that until matters improve, and people can really support themselves by labour or from credit in their villages, it is most inexpedient that they should be sent back to their homes to live there on gratuitous relief;—when they might be earning wages on large works, which would permanently benefit their country, or when if incapable of labour they might be better kept in in relief camps. Village relief in the shape of a money dole, or in any other form, should be granted only to those who are both incapable of work and without other adequate means of support. The Viceroy would be glad that this point should be made quite clear in any orders which the Governor in Council may now issue to local officers.

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8. The Viceroy presumes that the standing orders, cited as requiring that large public works should be remunerative, are the instructions issued regarding the selection of reproductive irrigation works in ordinary times. During the present famine this requirement, so absolutely necessary in ordinary years, has been relaxed in the Bombay Presidency, with the concurrence of the Supreme Government.

9. Steps are being taken to procure from other parts of India the additional engineering and other European assistance indicated in your seventh paragraph, as required by the Government of Madras. And it is hoped that the officers selected for Famine duty will shortly report themselves at Gooty or at Madras. The additional temporary appointments described in your fourth and eighth paragraphs can be made by his Grace the Governor, as soon as they are necessary, in anticipation of formal sanction, for which application, with full particulars of salary and allowances, should be made in each case.

10. In conclusion I am to express the hope of his Excellency the Viceroy that the arrangements now determined on will greatly facilitate the attainment of the objects with which his Excellency undertook his journey to Southern India. He trusts that they will strengthen the hands of the Madras Government; that they will secure full agreement on principles between the two Governments; and that they will combine, with the efficient relief of the afflicted population, that economy which is imperatively demanded by the financial interests of the empire.

No. 203.

Encl. in No. 216.

NOTIFICATION of the GOVERNOR-GENERAL.

In pursuance of the arrangement described in the foregoing correspondence, the Viceroy is pleased to appoint the Honourable Major-General M. K. Kennedy, R.E., to be Personal Assistant to his Grace the Governor of Madras in famine matters as a temporary arrangement.

By order of the Viceroy and Governor-General of India.

C. BERNARD,
Additional Secretary to the Government of India.

No. 204.

Telegram, dated 1st September 1877.

From GOVERNOR OF BOMBAY to SECRETARY OF STATE.

Since my telegram of 27th, rain in Malwa and Hyderabad, which further improves position in Bombay Presidency. Some rain Broach, Baroda, Ahmednagar, Belgaum, and Poona; more rain Surat and East Kattywar; condition of whole district Kaladgi bad. Situation critical in West Kattywar, Ahmedabad, Poona. Good rain in Concan, but monsoon irregular and defective. Drought north of India stopping influx of supplies by Jubbulpore; prices fallen in some places, but generally high, but stock large. Distress continues severe.

No. 205.

Encl. in No. 215.

PROVINCE OF MYSORE.—SPECIAL FAMINE REPORT.

(No. 29.)

For the week ending 25th August 1877.

(To avoid confusion, the tabular statement and letterpress refer only to returns closed at midnight on Saturday the 25th August. From that date to the despatch of this Return, any noteworthy incidents are briefly noted hereunder.)

Interim Report.

Bangalore, 1st September 1877.

The weather has given promise of rain during the last three days, but, with the exception of light showers, none has fallen, and high westerly winds have set in again.

Bangalore District.—Markets fairly supplied; prices rose in six taluks. Rain fell in the Bangalore, Hoskote, Devanhalli, and Closepet taluks, the quantity registered varying

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from 20 cents to 2·10 inches. Crops in fair condition in some localities. Extended cultivation generally prevented from want of rain. Fevers, dysentery, &c. prevail.

Kolar District.—Markets continue supplied, except in the Gudibanda and Gumnayakanpalya taluks, where the supply was limited; prices fluctuating, and show a tendency to rise. Rain fell in five out of the 10 taluks in the district, the quantity gauged at their head-quarters ranging from 56 cents to 2·25 inches. The standing crops are suffering from want of sufficient rain, and ryots appear disinclined to risk more seed. Some of the crops irrigated by wells were harvested. Public health is bad, owing to the prevalence of fevers, cholera, and small-pox.

Tumkur District.—Markets pretty well supplied; prices unsteady. Rain fell in the Sira, Kadaba, and Maddagiri taluks, the maximum quantity registered at their head quarters being 1·20 inches. Irrigated crops are doing fairly well, but the dry crops are fast withering. Prospects are gloomy to a degree, and distress is on the increase Diarrhœa and dysentery are still prevalent.

Mysore District.—Markets sufficiently supplied, except in the Ashtagram, Gundlupet, and Malvalli taluks, where importation was rather slack; prices rising. Light showers of rain have fallen in all the taluks, the maximum quantity registered at the head-quarters of which amounted to 1·48 inches. The wet crops, especially those under river channels, are reported to be thriving, but the dry crops are withering. Javari is being harvested. Water-supply in wells is failing. Prospects remain unchanged. Cholera is abating.

Hassan District.—Markets fairly supplied, except in the Nagamangala, Harnhalli, and Narsipur taluks; prices fluctuating. Light showers of rain fell in all the taluks except Arkalgúd and Belur, and from 10 cents to 1·15 inches were registered at their head-quarters. Crops in Manjarabad and in parts of the Hassan taluk, as well those below channels in the Attikuppa and Narsipur taluks, are thriving; but elsewhere they are suffering from the drought and from the ravages of insects. Javari raised in the beds of tanks has been reaped in the Nagamangala taluk, and horse-gram was sown in Arkalgúd. Fever and dysentery prevail generally throughout the district, and cholera also in two taluks.

Shimoga District.—Markets continue fairly supplied, except in the Honnali and Nagar taluks; prices pretty steady. There was no rain during the week except at Nagar and Shimoga. The standing crops, except in the purely Malnad taluks, are withering for want of rain. Baragu (a kind of millet) was harvested in parts of the Honnali taluk. Cholera, fever, and dysentery are still prevalent.

Kadur District.—Markets fairly supplied, except in the Múdgere, Tarikere, and Lakvalli taluks; prices fluctuating. Light showers of rain fell in all the taluks except Tarikere and Lakvalli. Crops in the Malnad taluks and those under irrigation below tanks are doing well, but in other places are withering for want of rain. Public health is bad owing to the prevalence of fevers, small-pox, dysentery, and cholera.

Chitaldroog District.—Markets sufficiently supplied, except in Davangere and Budihal taluks, where importation was slack; prices fluctuating. Excepting a light drizzle at Davangere, there was no rain in any of the taluks, in consequence of which the crops in many places are fading, and will be destroyed if no fall of rain occurs shortly. The water supply in the tanks has diminished considerably. Dysentery and fever are still prevalent, and cholera in some places.

General Remarks.

The district reports for the week ending 25th August, of which an abstract accompanies this narrative, show that there has been no improvement in the prospects. The rainfall was scanty, and the young crops were to a great extent suffering from drought.

2. The crops in the Malnad are reported to be doing well, but even in the Shimoga District the wet crops in the maidan taluks are, it is said, failing. In low lands the dry crops are holding on, but would, it is feared, seriously suffer should no rain fall in the course of a week.

3. The mortality returns show that cholera is somewhat on the decline, though public health continues to be bad owing to the prevalence of other diseases. The number of deaths from cholera reported during the week was 71, or 66 less than in the previous week.

4. The number of works in progress under revenue officers was 1,719 as against 1,710 of the preceding week, and the daily average number of persons employed on them was 25,644, or 701 less than in the previous week. The decrease was chiefly in the Bangalore, Kolar, and Hassan Districts. The amount sanctioned for works under civil officers was Rs. 18,07,349, of which Rs. 12,22,973 were expended, leaving an available balance of Rs. 5,84,376. As has been remarked in a previous report, the returns of expenditure do

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not appear to include all works actually in progress, and the attention of Commissioners and Deputy-Commissioners will again be drawn to the very large sums shown in the taluk accounts as remaining unutilized. The expenditure during the week under review was Rs. 18,486, or Rs. 1,176 less than in the previous week, as shown below :—

	Past Week.	Present Week.
Bangalore District -	6,386	6,186
Kolar „ -	3,383	2,902
Túmkúr „ -	962	1,865
Mysore „ -	1,105	535
Hassan „ -	1,501	1,362
Shimoga „ -	1,748	1,676
Kadur „ -	643	1,457
Chitaldroog „ -	2,894	1,739
Bangalore Municipality -	933	643
Mysore „ -	107	121
Total -	19,662	18,486

5. The average daily number of persons employed on works carried on by the Professional Department was 22,975, showing a small increase of 120 over that of the previous week; but, taking the figures by districts, it will be seen that the decrease was general in all the districts excepting Túmkúr, Hassan, and Chitaldroog. The decrease on irrigation works is attributed partly to the completion of some of the works and partly to the ryots being employed on agricultural operations. In No. II. Subdivision, Bangalore Range, there was a falling off in the number owing to the persons who were relegated from the Krishnarajpur kitchen last week not having been sent this week. The attention of the officer in charge of the kitchen will be drawn to this, with a view to such of the inmates as are able to do light work being regularly deputed to the works which are close by. In the Hemavati Division, it is said, there is a difficulty in procuring labour at present, as the ryots are employed in the cultivation of lands lately taken up. It is, however, anticipated that there will be a steady rise in the numbers on works, as transplanting operations have now ceased, and as failure of rains has thrown many of the ryots out of employment, and who as a class are too independent to willingly enter our kitchens. In the Roads and Buildings Branch the numbers are slowly increasing. On the Nelamangala road in the Bangalore Division the labour, it is said, was nearly double what it had been during the previous week, and the coolies were, it is reported, working fairly. In the Kolar range the assistant engineer reports that labour had to be reduced for want of water. Further explanation has been called for on this point. It would appear that on the Bangalore-Bellary road, *viá* Devanhalli, many men and women coolies have offered to collect and break metal provided they were paid daily, and without a rigid task being exacted from them.

6. The total number employed daily on works, both under civil and departmental public works officers, was 48,619, or about one per cent. on the total population and 1·86 per cent. on the population of the affected area.

7. The number charitably relieved is still on the increase. The daily average number fed in kitchens and camps was 213,710, or 19,627 more than in the previous week, as shown under :—

	Increase over past Week.	Decrease.
Bangalore District -	4,054	—
Kolar „ -	1,726	—
Túmkúr „ -	7,510	—
Mysore „ -	—	1,444
Hassan „ -	1,223	—
Shimoga „ -	260	—
Kadur „ -	—	77
Chitaldroog „ -	2,345	—
Bangalore Municipality -	4,169	—
Mysore „ -	—	139
Total -	21,287	1,660
Deduct decrease -	1,660	
Net increase -	19,627	

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8. There has been an enormous increase in the Bangalore District (including the town and cantonment); and as regards the large accession to the number in the Túmkúr District, which had risen from 35,868 to 43,378, the Deputy Commissioner writes as follows:—

"It is feared this figure will rise even higher, as the distress in the district is assuming an alarming aspect, and the house-to-house visitation is being strictly insisted on. The poor seem now to welcome the relief which not long ago they would on no terms have accepted. Works have been sanctioned throughout the district on all the district fund roads, a measure which will keep many from the kitchens; but once these roads are brought up to standard, it will be imperatively necessary for some large imperial work to be taken in hand, as, judging from the strides the famine is now taking, there will be thousands seeking work, which, if not at hand, will simply necessitate our feeding them at the kitchens. The road works now undertaken will probably suffice till the end of September."

9. In the Hassan District also distress is rapidly increasing, and arrangements are being made by the Commissioner to establish additional relief camps, and to carry on suitable relief works to afford employment to the distressed, and to prevent them from deserting their villages.

10. Of those relieved gratuitously 52,295 were men, 82,895 women, and 78,520 children. The proportion of the number in receipt of charitable relief to the total population and population of the affected area was 4·23 per cent. on the former and 8·206 on the latter. Excluding the Nundydroog Division, the number gratuitously relieved in the other districts was about 1·06 per cent. on the total population, and 2·06 on affected population. The attention of the Commissioner of Nundydroog Division is again drawn to the very large increase in the number charitably relieved in the three districts under his supervision, as compared with the numbers relieved in the other districts.

11. The total expenditure incurred up to date on account of gratuitous relief, is Rs. 15,20,539, of which Rs. 1,32,114 were spent during the week, as shown below:—

	Rs.		Rs.
Bangalore District -	36,441	Kadur District - -	1,420
Kolar „ - -	11,106	Chitaldroog District -	23,507
Túmkúr „ - -	30,422	Bangalore Municipality -	16,771
Mysore „ - -	1,780	Mysore „ -	1,220
Hassan „ - -	7,521		
Shimoga „ - -	1,926	Total -	1,32,114

12. The physical condition of the persons who have been fed in the kitchens for some time is said to be improving, and the Commissioner of Ashtagram Division considers "that a portion of those receiving relief are either now, or will be soon, fitted for light "labour;" but it is said there is a great difficulty in providing these, owing to the large proportion of women and children as compared with men. The district officers have been called upon to furnish a return of the number of persons fed in kitchens and camps from whom work of any kind is exacted. In the Bangalore District many are, as already reported, relegated from the kitchens to the nearest works to do some light work according to their capacity.

13. The weight of grain imported by rail during the week, including consignments to the Kolar road station, was 3,787 tons, being 1,493 less than in the previous week, as shown below:—

	Past week.	Present week.
From Madras - - - - -	4,139	3,125
„ Beypore, Malabar, and Coimbatore Districts	521	174
„ Trichinopoly, Tanjore, and Negapatam -	582	473
„ other places - - - -	38	15
Total -	5,280	3,787

14. The quantity exported by road, from Bangalore to the interior of the province and the frontier taluks of the Madras Presidency, amounted to 2,438 tons, being 698 less than in the preceding week, as noted below:—

	Tons.		Tons.
Towards Túmkúr District - -	822	Towards Oossoor, in the Salem District - - - -	149
„ Bellary and Chitaldroog Districts - -	435	To taluks adjoining Bangalore -	640
„ Mysore District - -	392		
		Total -	2,438

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15. The average prices of food grains were somewhat steady during the week, and the maximum and minimum rates which prevailed in the taluks were as shown in the following abstract:—

	Maximum in lbs. 2nd sort Rice.	per Rupee. Ragi.	Minimum in lbs. 2nd sort Rice.	per Rupee. Ragi.
Bangalore District -	10½	13	8½	10
Kolar „ -	11¼	13½	8½	11
Túmkúr „ -	9½	12	8	10
Mysore „ -	10	12	8	10
Hassan „ -	9	11	8	8
Shimoga „ -	10	9½	6½	8
Kadur „ -	9	10	7	9
Chitaldroog „ -	9½	12½	8	10

16. The Commissioner of Ashtagram Division having reported that occasional difficulties occur in the prompt supply of grain in the relief camps in the Mysore District, the Chief Commissioner has approved of tenders being invited for the supply, weekly, of the required quantity of ragi, till the end of November next, as it is apprehended that there will be an increased demand for the supply of grain to the kitchens for the next three months.

17. The Committee for the examination of grain brought by rail to Bangalore report that during the month of July out of about 280,000 bags received 541 suspected to contain damaged rice were examined, of which 402½ were passed, and the remainder, 138½ bags, condemned.

18. The Director of Public Instruction has recently reported that a considerable number of pupils in both taluk and hobli schools have in certain places gained admission to relief kitchens or camps, and that in other places admission is denied to boys attending schools. In the case of those admitted to relief it would seem they are apparently required to leave school altogether, and to do a certain amount of task work in return for the rations received. The Chief Commissioner has ruled that, if the parents of the boys in schools are not themselves in need of relief, the boys should not be relieved gratuitously, as they should look to their parents for support, exception being made only as regards orphans; and that the boys who are deserving of relief may be exempted from work on the production of a certificate from the head master of the school that they attend and prosecute their studies regularly.

19. As a measure of relief to the poorer classes of pensioners of the Mysore State, who were reduced to great straits owing to the prolonged drought and high prices of the necessaries of life, the Chief Commissioner has directed that the usual famine allowance of Rs. 1—8—0 per mensem be disbursed to them from 1st August till further orders. The concession is limited to those whose pensions do not exceed Rs. 8 per mensem.

20. In consequence of the great increase in crime caused by the present famine the work of the Deputy Commissioners in the three districts of the Nundydroog Division and of the sessions judge has considerably increased, and, on the urgent representation of the Judicial Commissioner, the Chief Commissioner has, in anticipation of the sanction of the Government of India, decided on appointing an additional sessions judge for the Nundydroog Division, under the provisions of Section 17 of Act X. of 1872, to relieve, temporarily, both the Commissioner and his deputies of a greater portion of their criminal work, and to enable them to devote more attention to famine operations.

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PROVINCE OF MYSORE.

(No. 29.)

CONDITION STATEMENT FOR THE WEEK ENDING 25TH AUGUST 1877.

DIVISIONS AND DISTRICTS.	Area in square miles.	Affected area in square miles.	Population.	Population of the affected area.	No. and description of works in progress under Revenue Officers.					Daily average number of persons employed on works of all kinds under Revenue Officers.		Daily average number of persons employed on works carried on by the Professional Department.		Amount sanctioned up to date of report for works under Revenue Officers.	Expenditure from the above amount known up to date.	Amount sanctioned up to date of report for works under Officers of the Professional Department.	Expenditure up to date from the above amount.	Particulars regarding gratuitous relief.						Prices of staple grains in lbs. per rupee.						Average Rainfall for five years in inches, calculated up to 31st March 1876.	Total Rainfall from 1st April 1876, up to 18th August 1877.	Rainfall during the present week.	REMARKS.
																		Daily average number of persons gratuitously relieved at kitchens and camps.		Grants for gratuitous relief.			Total Expenditure up to date.	Average in ordinary years.		During last week.		During present week.					
					Roads.	Tanks.	Miscellaneous works.	Total present week.	Total last week.	During last week.	During present week.	During last week.	During present week.					During last week.	During present week.	Amount of private subscriptions up to date.	Amount of Government grant.	Total.		2nd sort Rice.	Ragi.	2nd sort Rice.	Ragi.	2nd sort Rice.	Ragi.				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
NUNDYDROOG. Bangalore	2,914	1,914	828,354	384,968	32	136	129	297	298	8,409	7,580	3,966	3,738	3,29,317	2,26,123			54,195	58,249	1,506	5,01,625	5,03,131	5,06,955	26	66	10	12	10	12	35·	28·62	·54	—
NUNDYDROOG. Kolar	2,577	2,577	618,954	618,954	54	244	84	382	381	4,608	4,401	3,619	3,620	2,90,683	1,85,692			16,933	18,659	6,094	1,31,137	1,37,231	1,31,948	32	80	10	12	10	12	25·4	24·97	2·20	
NUNDYDROOG. Túmkúr	3,606	3,606	632,239	632,239	58	124	63	245	238	2,565	3,197	1,393	1,511	2,54,548	1,90,516			35,868	43,378	1,708	2,86,804	2,88,512	2,97,038	28	106	9	11	9	11	27·4	30·42	—	
AGHTAGRAM. Mysore	4,127	1,470	943,187	118,032	36	20	6	62	64	814	795	5,201	5,174	1,15,771	73,570	34,20,670	22,99,961	3,961	2,517	7,481	15,691	23,172	21,898	24	70	9	11	9	11	24·3	32·88	·03	
AGHTAGRAM. Hassan	3,291	2,154	668,417	190,873	41	33	22	96	102	1,802	1,432	2,289	2,315	1,32,664	1,06,813			8,428	9,651	2,758	83,611	86,369	84,994	32	76	9	9	9	9	34·4	29·72	·57	
NAGAR. Shimoga	3,797	388	498,976	47,431	23	71	41	135	126	1,216	1,322	1,400	1,387	2,35,060	1,42,528			2,273	2,533	5,599	14,723	20,322	18,639	30	76	8	8	8	8	38·4	34·09	·01	
NAGAR. Kadur	2,294	691	333,925	100,444	10	40	83	133	133	705	904	1,953	1,896	1,00,458	49,633			2,178	2,101	2,573	16,839	19,412	19,067	30	64	8	9	8	9	35·7	36·89	·08	
NAGAR. Chitaldroog	4,471	4,238	531,360	511,204	44	46	221	311	309	5,111	5,139	2,834	3,334	2,68,425	1,75,217			31,779	34,124	5,842	2,19,710	2,25,552	2,12,013	24	88	9	11	9	11	23·5	21·62	—	
Bangalore Municipality	—	—	—	—	—	1	55	56	57	1,062	803	—	—	30,702	31,537	—	—	35,409	39,578	23,182	1,64,135	1,87,317	1,88,198	—	—	—	—	—	—	—	—	—	
Mysore Municipality	—	—	—	—	2	—	—	2	2	53	71	—	—	40,721	41,344	—	—	3,059	2,920	12,595	30,983	43,378	39,789	—	—	—	—	—	—	—	—	—	
Total	27,077	17,038	5,055,412	2,604,145	300	715	704	1,719	1,710	26,345	25,644	22,855	22,975	18,07,349	12,22,973	34,20,670	22,99,961	1,94,083	2,13,710	69,138	14,65,258	15,34,396	15,20,530	—	—	—	—	—	—	—	—	—	

NOTE.—1. The expenditure entered in column 24 includes the amount contributed by private subscriptions, as well as the Government grant-in-aid thereto.
2. The figures entered in columns 17 and 18 are based on the latest accounts received from the Examiner, Public Works Accounts.
3. The figures against the Shimoga District under columns 15 and 16 have been corrected according to a revised return recently submitted, and those in columns 19 to 24 include those of the Kavaledurga taluk, where a relief kitchen has been recently opened.

T. R. A. THUMBOO CHETTY, Assistant Secretary.

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Register of Rainfall recorded scientifically at the Government Observatory at Bangalore for each week in the Year, as the usual Monthly Averages do not give sufficiently reliable information in a Tropical Climate.

Week.	Month.	Rainfall—Inches and Cents. Average of 1871, 1872, and 1873.		1874.		1875.		1876.		1877.		Remarks for 1877.
1st	January.	—	—	—	—	—	—	—	—	—	—	
2nd		—	1	—	—	—	—	—	—	—	—	
3rd		—	1	—	—	—	—	—	—	—	—	
4th		—	—	—	—	—	—	—	—	—	—	
5th	Feb.	—	—	—	—	—	—	—	—	—	—	
6th		—	14	—	—	—	—	—	—	—	—	
7th		—	—	—	—	—	—	—	—	—	—	
8th		—	—	—	—	—	—	—	—	—	—	
9th	March.	—	9	—	—	—	—	—	—	—	—	
10th		—	40	—	—	—	—	—	—	—	—	
11th		—	—	—	—	—	—	—	50	—	65	
12th		—	—	—	—	—	86	—	7	—	—	
13th	April.	—	—	—	—	1	56	—	47	—	—	
14th		—	41	—	—	—	31	—	—	2	20	
15th		—	20	—	14	—	—	—	47	—	—	
16th		—	40	—	—	—	—	—	5	—	—	
17th		—	2	—	45	—	15	—	—	—	1	
18th	May.	1	86	—	13	—	—	1	37	—	22	
19th		—	19	6	20	—	85	1	93	—	—	
20th		—	24	1	12	2	39	—	34	1	30	
21st		—	36	3	88	—	35	—	93	—	75	
22nd		1	9	4	28	—	48	—	3	1	15	
23rd	June.	—	39	—	20	1	69	—	1	—	97	
24th		—	10	—	83	1	43	1	42	1	77	
25th		—	88	—	28	—	7	—	21	—	26	
26th		1	15	—	30	—	14	—	67	—	—	
27th	July.	—	14	—	11	1	73	—	75	—	35	
28th		1	11	—	48	—	3	—	45	—	—	
29th		—	71	3	44	—	39	—	2	—	2	
30th		—	19	2	42	—	19	—	23	—	76	
31st		1	8	—	28	—	63	1	66	—	62	
32nd	Aug.	2	42	2	74	1	24	—	20	—	75	
33rd		1	98	1	51	—	59	1	60	1	31	
34th		1	97	1	96	—	86	—	58	—	54	Week ending 25th August 1877.
35th		—	54	1	45	1	59	—	50	—	—	
36th	Sept.	2	30	4	65	—	—	1	7	—	—	
37th		3	24	4	63	—	6	—	3	—	—	
38th		1	5	3	8	1	19	—	—	—	—	
39th		1	56	2	31	—	54	—	45	—	—	
40th		3	12	2	20	—	27	—	72	—	—	
41st	Oct.	1	11	—	59	—	—	—	—	—	—	
42nd		1	76	1	30	—	45	—	—	—	—	
43rd		—	48	2	56	1	39	—	—	—	—	
44th		—	5	1	75	—	—	—	—	—	—	
45th	Nov.	—	33	—	82	—	26	—	52	—	—	
46th		—	47	—	—	—	34	—	—	—	—	
47th		—	10	—	—	—	—	—	—	—	—	
48th		—	49	—	35	—	—	—	9	—	—	
49th	Dec.	—	42	—	9	—	—	—	—	—	—	
50th		—	8	—	1	—	3	—	—	—	—	
51st		—	1	—	—	—	—	—	—	—	—	
52nd		—	—	—	—	—	—	—	—	—	—	
		34	66	56	54	22	6	17	34	—	—	

Mean Meteorological Results from the Bangalore Observatory Register.	For the week ending 11th August 1877.	For the week ending 18th August 1877.	For the week ending 25th August 1877.
Reduced atmospheric pressure -	26·982	26·978	27·011
Mean temperature of air -	76·5	75·0	79·7
Maximum solar heat in vacuo -	150·0	147·8	151·8
Maximum in shade - -	86·2	84·4	88·1
Minimum in shade - -	67·3	67·7	67·3
Depth of rain in inches - -	0·75	1·31	0·54

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No. 206.

Telegram, dated 2nd September 1877.

From Governor of Madras to Secretary of State.

Famine matters fully discussed with Viceroy. No difference of opinion; all arrangements made perfectly satisfactory. Viceroy will leave me General Kennedy. Council leave famine matters to me. Viceroy will give us the needed staff in works and for inspection.

No. 207.

Telegram, dated Madras, 2nd September 1877.

From Viceroy to Secretary of State.

I have sent the following telegram to President in Council. Message begins,—

Governor and myself are in full accord on the famine policy to be pursued in Madras in present emergency, and in personal conferences we have decided upon following action. Governor has addressed me a letter, dated 31st August, containing following headings:—

First. Governor, under section 29 of India Councils Act, purposes to take famine portfolio, and to dispose absolutely of famine questions; his orders to have force of orders issued by Governor in Council.

Second. An officer possessing the confidence of the Government of India to be attached to the Governor, in the position of personal assistant to Governor in famine management.

Third. All engineers and district authorities to address all references and reports on famine matters, including relief works, to the Famine Secretary direct, and not through Board of Revenue. Board will be kept fully informed of all orders passed, and their advice asked when necessary.

Fourth. Members of Board of Revenue to be deputed to visit the distressed districts, inspect relief operations, and report to Government on them.

Fifth. Grain supplies. As decided in January last, Government not to interfere with private trade, but Government of Madras has permission to buy seed-grain if such arrangements be found better than advances of money.

Sixth. Public works to be the backbone of relief system, all other forms of relief being subsidiary to main scheme; all relief works of magnitude to be directed and controlled by Public Works Department agency.

Seventh. Gratuitous relief to be temporary, and subsidiary to main object of getting distressed people on to works. Necessary to maintain relief camps to receive the starving, helpless, and infirm; ultimate object to keep relief camps as receiving places only for people to be drafted on to works or to their homes.

Eighth. Village relief to be generally confined to resident villagers who are bed-ridden or otherwise incapable of labour.

Ninth. To give effect to these principles, Government of Madras asks for a considerable temporary addition to the engineering and supervising staff of Presidency, consisting of 60 engineers and 100 active young European officers of army, police, or forest.

Tenth. The two chief engineers of the Presidency to be deputed from time to time into the interior. Government of India to sanction a third temporary chief engineer, if necessary.

In reply, dated 31st August, I have expressed satisfaction at results of our personal conferences, and at the measures adopted in the present crisis for promptitude of action and unity of control. I have appointed General Kennedy personal assistant to the Governor in famine matters, through whom all famine questions will be laid before his Grace. The object of this appointment is that the views of the Government of India may be permanently represented on the spot in the person of an officer possessing its full confidence. Viceroy and Duke are entirely agreed as to necessity of this arrangement, in order to unite and cover responsibility of both Governments without causing friction. I have signified pleasure of Government of India that the views of the Madras Government in questions of famine policy are now so entirely in accord with those of the Government of India. I have communicated to Madras Government officially my Famine Minute of 12th August, and urged general expedience of getting full proportion of relief recipients to employment on large public works of permanent usefulness to the country, and greater stringency in conferring gratuitous relief of all kinds to those who are unable to work. I have sanctioned purchase of seed grains

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in those rare cases where it may be necessary, on condition that such purchase be made through trade. I have promised to furnish the required engineering and other European staff necessary for giving effect to our policy, and have agreed to sanction such extra temporary appointments, engineer and other, as the Madras Government may require.

This correspondence will be published in a Gazette to be issued on Monday. Message ends.

I trust you will approve the action above recorded. My relations with the Duke are most cordial, and I take this opportunity of expressing to you my grateful appreciation of the frank and efficient manner in which his Grace has met and seconded my efforts. The present arrangements, which have removed all cause of possible misunderstanding or divergent action between the two Governments, could not have been thus promptly and amicably concluded without this valuable co-operation to which I feel greatly indebted. I am confident that, under the personal direction of his Grace, the famine will be managed with a vigour and sound discretion not otherwise attainable, and that great advantage will accrue both to the permanent welfare of this Presidency and to the public treasury.

No. 208.

Encl. in No. 216.

No. 780, dated Madras, 2nd September 1877.

From Additional Secretary to the Government of India to the Secretary to the Government of Bombay.

The Viceroy's telegram of yesterday's date asked that the services of Major-General Kennedy might be temporarily placed at the disposal of the Government of India for employment in connexion with the famine in the Madras Presidency. During the Governor-General's stay at Poona his Excellency Sir Richard Temple was good enough to agree to General Kennedy's accompanying the Viceroy on his present journey to the Madras Presidency. Formal notification of the arrangement therefore is now solicited.

2. The Viceroy and Governor-General desires to express his high sense of the public spirit and loyalty which have prompted the Government of Bombay thus to spare, for service in another part of India, an officer who has under their direction so well controlled the operations for mitigation of the famine which unhappily still afflicts the Bombay Presidency. His Excellency the Viceroy is confident that the Government of Bombay, under its far sighted and energetic Governor, will, with the help of the officers of the Bombay services, meet famine difficulties in the future as successfully as they have done in the past. Meanwhile General Kennedy's personal experience of the Bombay famine management will be of the greatest value to his Grace the Governor of Madras.

No. 209.

Telegram, dated September 3, 1877.

From Governor of Bombay.

Since telegram of 1st, further improvement situation Bombay Presidency, from rain—Baroda, Ahmedabad, Concan, and several parts Deccan.

No. 210.

Encl. in No. 253.

No. 2630 B, dated Fort St. George, September 3, 1877.

From J. H. Garstin, Esq., Additional Secretary to Government of Madras, to S. C. Bayley, Esq. C.S.I., Additional Secretary to the Government of India.

I am directed to acknowledge receipt of your letter of the 1st instant, No. 776, and to state that the Madras Government have taken no part in the matter of applying to the public for subscriptions in aid of famine relief, although, at the request of the citizens of Madras, the head of the Government consented to preside at a public meeting convened by the Sheriff to consider the advisability of appealing to England for such aid.

2. I am to add that your letter will be communicated at once to the General Committee of the Madras Famine Relief Fund, with whom rests the duty of administering the funds raised, with an intimation that the officers of Government in their official

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capacity will nowhere be allowed to be disbursers of any funds which may be placed at the Committee's disposal, although the Government have no reason to suppose that the Committee are relying on the agency of State establishments for the administration of their private funds.

Encl. in No. 216.

No. 211.

THE GAZETTE OF INDIA EXTRAORDINARY.

Governor-General's Camp, Madras, September 3, 1877.

GOVERNMENT OF INDIA, DEPARTMENT OF REVENUE, AGRICULTURE, AND COMMERCE.

FAMINE.

The subjoined papers describing—

Nos. 201, 202. (i.) Administrative arrangements adopted after conference between the Viceroy and the Governor of the Madras, for meeting the increased pressure of famine in the Madras Presidency;

Nos. 199, 200. (ii.) The views of the Government of India regarding the collection of public subscriptions, and their expenditure by means of private organizations on the relief of distress outside the compass of Government operations,

together with a minute recorded by his Excellency the Viceroy on the 12th August, are published for general information.

By order of the Viceroy and Governor-General of India.

C. BERNARD,
Additional Secretary to the Government of India.

No. 212.

Telegram, dated September 5, 1877.

From GOVERNOR OF BOMBAY to SECRETARY OF STATE.

Though famine prospects are improving there is great want of revenue officers, as some are ill and some lent to Madras. The Bombay Government beg your Lordship will order the following officers to proceed to Bombay by the first mail in October:—J. E. Oliphant, R. Elphinston, J. R. Middleton, E. G. Sharkey, W. Ramsey, G. W. Vidal, G. B. Reid, W. G. Peddar, J. Macleod Campbell, G. Waddington, W. Forman.

No. 213.

Telegram, dated Madras, September 5, 1877.

From VICEROY to SECRETARY OF STATE.

Season telegrams as follows:—Madras 1 to 1½ inches of rain in Bellary, Cuddapah, Kurnool, much benefit; good rain in Ganjam, Vizagapatam, Kistna. Thunderstorm and 1 inch rain in Madras on 4th, only ½ inch elsewhere, save occasional heavy showers. Crops improved by rain, except South Arcot, Coimbatore, Salem, Madura. Prices dearer.

On works 901,227: on gratuitous 1,430,875. Grain importations large. Railway transport improving.

Bombay, showers throughout week everywhere: 4 inches of rain all over Guzerat; continuous heavy rain all Concan districts; good rain throughout Khandesh, Nassik, Sattara, Belgaum, and greater part of Poona and Sholapur; partial rain in Dharwar, Kaladgi; prospects much improved; prices not yet cheaper.

Numbers on works 278,731; on gratuitous 125,960.

Mysore, bad week; occasional light showers; good rain in Bangalore in night of 2nd September, gauging 1½ inches. Dry crop, prospects worse in all districts. Gratuitous numbers 213,000; works, number 49,000.

Hyderabad, three days good rain, over 4 inches, much benefit; good rain in Berar, Rajputana; heavy rain in Aboo and south-west States; good rain in Jeypore; heavy showers in Ajmere, Meywar, and east States. Lyall telegraphs: general prospect very materially improved; more rain needed in Ulwar, Meywar, Central India. Good rain in Rutlam, Indore, and all Malwa; 2 inches rain in Neemuch, Gwalior, Bundelkund. Too late to save much autumn crop in Gwalior; still prospects everywhere improved.

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North-western Provinces: moderate rain in Allahabad, Benares divisions, 4 inches in Jhansi division; ½ an inch in Agra; good rain, one day, in Meerut and Bareilly, rest slight partial showers. Autumn crop lost in many parts.

Punjab: dry hot weather up to 2nd, then heavy universal rain over Province, gauging 9½ inches at Loodhiana, too late to save autumn crops in parts. Lieutenant-Governor telegraphs, prospects immensely improved, spring crop sowings secured over the important grain producing districts.

Bengal, Central Provinces, Burmah, Assam; seasonable weather, good prospects.

No. 214.

Telegram, dated Madras, 5th September 1877.

From Viceroy to Secretary of State.

Have verified Madras railway requirements. I consider matters might be safer if we get 20 engines, besides Madras railway supply and indent for 20 sent by Madras Government and confirmed by me; but no good unless additional power available in short time. Please telegraph when the 20 locomotives asked for by my message of 30th will reach, and when the extra 20 now proposed could arrive. Make preliminary arrangements for extra 20. I will confirm order when I hear how quickly they can reach. Type to be State Railway, unless "Trevethicks" type comes much sooner. Also say how quickly State locomotives for Bombay can reach with half bonus.

No. 215.

No. 33 of 1877.

From the Governor-General of India, Department of Revenue, Agriculture, and Commerce (Famine), to the Secretary of State for India.

Madras, September 5, 1877.

In a letter dated the 20th August your Lordship was informed that I was about to leave Simla, accompanied by Sir Alexander Arbuthnot, and the officers named in the margin, on a journey to Poona, Madras, and Bangalore for the purpose of conferring with the Local Governments and the Chief Commissioner of Mysore on the measures rendered necessary by the failure of the early rains (summer monsoon), and the alarming character of the prospects described in a minute by myself which accompanied that letter.

Mr. S. C. Bayley, C.S.I.
„ C. Bernard, C.S.I.
„ Guilford Molesworth, C.E.

2. I now desire to lay before your Lordship a short account of what I have heard and seen, and of some of the more important references in famine matters, which have come before the Government of India during the past fortnight. In a separate letter of to-day's date will be found an account of my conference with the Governor of Madras, upon the lines of famine policy laid down by the Government of India, and of certain special administrative arrangements adopted by his Excellency in Council, for giving to that policy the fullest and most prompt effect. The following remarks on the condition of the crops and the prospects of the season, as they have appeared to me in the course of my journey from Simla to Madras, must be taken subject to correction by the light of more recent information. Our latest intelligence on these points is embodied in a telegram despatched to your Lordship to-day; and a copy of that telegram will be found in the last paragraph of this letter.

No. 216.

3. Leaving Simla on the 16th August I met at Amballa the Commissioner of that division of the Panjab; who gave a very bad account of the prospects of the autumn crop. Over great tracts of the dry loose soil of the Cis-Sutlej country there had been no appreciable rainfall since early in July; a great part (the proportion could not be exactly stated) of the land prepared for autumn crops had not been sown, and much of what had been sown had withered. But there were still some weeks to the time for sowing the spring crops which yield the great food harvests, and should rain fall within that period these crops would be sown over a larger area than usual. Water in the irrigation wells was not failing, though the hot dry winds scorched the crops and made irrigation less efficacious than in ordinary years. The appearance of the land round Amballa was for the season of year extremely dry and arid.

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4. On the morning of the 18th I met the collectors of Agra and Allyghur in the North-West Provinces. Prospects in the Agra district were then as bad as in any part of the North-West Provinces; and they were said to be less hopeful than in the Amballa Division. In the Allyghur district there is more well irrigation and more canal irrigation, so that a considerable autumn food crop will be secured. In both districts there seemed to be already some fear about fodder for the cattle. In Allyghur, with its many canal channels, this difficulty will probably be not so great. But in the Agra district if rain holds off there must be great loss of cattle. The River Jumna there flows between high banks, unclad by verdure, and differs in this respect from the Ganges, which annually floods a broad belt of low ground beside its bed.

5. At the Agra junction station I was met by His Highness the Maharaja of Jeypore with some of his chief officials. The Maharaja is most laudably anxious about the prospects of his territory, and he placed in my hands a memorandum describing some of the measures he proposed to take for the prevention or relief of anticipated distress. The position in Jeypore was in brief, that crops had failed to a large extent, that the grass was withering, and that already dearth was beginning to be felt.

6. Simultaneously with this memorandum a letter was received from Mr. Lyall, the Governor-General's agent, stating that the whole of Rajputana, north-west of the Aravelli mountains, was threatened with serious scarcity; that the crops were widely damaged, grass withering, and pasturage already insufficient. In a subsequent letter Mr. Lyall stated that he had reason to believe there were large stocks of grain on hand, and that the people were hopeful. Opportunity was taken when answering these papers to explain at some length to the agent the famine policy which should be inculcated on the Maharaja of Jeypore, as well as on the Governments of other Native States similarly situated. As the Maharaja's memorandum, and my Secretary's reply to it, form Enclosure No. 1 to this letter, I need not here describe either the measures proposed by His Highness, or those which I have commended to his adoption.

Nos. 141, 145, 173, 181.

7. At Allahabad the local officers reported that though some of the autumn crops had suffered much from drought, yet prospects in the Allahabad and Benares divisions were not nearly so gloomy as in the northern commissionerships. It was said that in all parts of the Panjab and the North-West Provinces grain stocks in the hands of dealers, zemindars, and substantial ryots, were unusually large, and that prices had not yet grown so dear as might have been expected.

8. On the 19th August I met at Jubbulpore the Chief Commissioner of the Central Provinces, who was able to give a good account of the agricultural prospect throughout those provinces. He drew my attention to the very large and still increasing stocks of grain and seeds awaiting despatch from Nagpore, Jubbulpore, and other stations on the Great Indian Peninsula Railway; most of the grain, he explained, was consigned to the famine districts. He reported also that certain cases of corruption in the matter of allotting waggons had been brought home to station-masters on the two railways near Jubbulpore. The offenders had been or would be punished on conviction by the courts. Both those points—the grain block and the alleged misconduct of station-masters—were discussed with the proper authorities at Poona under circumstances which will be mentioned in a subsequent paragraph.

9. In the Khandesh and Nasik districts the country looked green, though the crops were backward. Much anxiety had been expressed about the condition of these two districts, and the local officials assured me that unless rain fell within ten days most of the crops then looking so well would wither. Happily from three to five inches of rain has since fallen in Khandesh; Nasik has also had good rain; and Sir Richard Temple's last report (30th August) says that "almost all anxiety regarding the Khandesh Collectorate" is removed.

10. I reached Poona on the night of the 19th August, and during five days stay there I had full opportunity of conferring with the Governor of Bombay, and with the chief Government and railway officials of that Presidency. Here I also met the collectors of Poona and Sholapore, as well as the Commissioner of the Southern Division. The prospects of the crops in the Bombay Presidency are now, save only in the Kaladgi District, much better than they were during the time of my stay at Poona; and therefore I need not trouble your Lordship with an account of the impressions I received in this respect. I visited a relief camp containing 3,000 inmates a few miles out of Poona. This camp had been recently opened, and several hundreds of its inmates were in process of transfer to relief works. The camp was well ordered; and the instructions under which it is managed will prevent its growing into an abuse. I have every reason to believe that, notwithstanding the very high prices now ruling in the Deccan and Canarese Districts, famine and distress are being met in the Bombay Presidency as successfully and econo

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mically as the means and circumstances permit. Save in the Kaladgi District, the crops to be reaped during the next five weeks will give a sensible relief to the people, and must reduce prices. It is worthy of note that in the districts of Kaladgi, Dharwar, Belgaum, and Sholapore the price of the commonest food-grain rules dearer than in any district of the Madras Presidency. The latest weekly report received from the Bombay Government forms Enclosure No. 2 to this letter. It shows that, as yet, the improved prospects have not caused reduction in the numbers on relief. There was an increase in numbers during the week, and there were at the end of August 278,731 on relief work, and 125,960 on gratuitous relief. No. 172.

11. One very important subject which was much discussed at Poona, both with the Governor and at a conference of all his railway officials, was the carrying power of the Great Indian Peninsula Railway, by which food-grain is sent, not only into the Bombay Deccan, but also into the Nizam's Dominions, and into the Ceded Districts of the Madras Presidency. Briefly stated the case stands thus. The sources of grain supply drawn from by the Great Indian Peninsula Railway are the city of Bombay, in which Sir Richard Temple reports the stocks to be very large; the Nagpore and Berar country; the Nerbudda valley districts; and the East Indian Railway, which despatches grain waggons through the Jubbulpore junction. This grain is consigned to Khandesh and Nasik, the districts above the ghats; to Bombay city; to the Bombay Deccan stations for the supply of Poona, Sholapore, Kaladgi, Sattara, and the Southern Mahratta feudatories; to the Hyderabad country; and, lastly, to the Madras Railway for the Ceded Districts. The quantities of grain which the Great Indian Peninsula Railway ought to deliver daily are:—

To the Khandesh section - - -	300 tons.
To the Bombay Deccan Stations - -	800 to 1,000 tons.
To the Hyderabad branch line - - -	300 tons.
To the Madras Railway at Raichore - -	900 tons.

The Great Indian Peninsula Railway authorities have after much pressure delivered these quantities, on the average, at each section, except at the Raichore end, where they have recently delivered an average of barely 600 tons a day. Now the Madras Government absolutely require the 900 tons a day to be delivered at Raichore, otherwise they cannot arrange for throwing into the interior the quantity of grain actually needed. The Bombay Government and the railway officers agreed that by starving all other railway traffic, and by practically stopping the export* trade, it would be possible, with the present rolling stock, to maintain on an average the grain deliveries demanded. Suggestions were made for additional crossing stations, for longer sidings, and for other traffic facilities; but, in the end, it was quite clear that the carrying power of the Great Indian Peninsula Railway was at present limited by its engine power, and that, adequately to meet the present emergency, additional engines were needed. Sir Richard Temple at the conference represented strongly that without additional engines the railway would be quite unable to serve the export trade, which would certainly demand accommodation in the cold season; and that, if produce could not be carried to the port of Bombay, shipping would go away empty, heavy mercantile losses must occur, the trade of Bombay would be injured, and the rate of exchange might suffer. If the engine power on the Great Indian Peninsula Railway could be largely increased by January next, then the railway could serve both the famine and the export trade. It seem clear that no sufficient relief could be given by borrowing engines from other lines. The Dhond and Munmar Railway, which, by shortening the railway route from Northern to Southern India, will relieve the pressure of famine traffic to the extent of thirty-six engine power, could hardly open soon enough to meet the urgency of the case. And, accordingly, I telegraphed to your Lordship for the earliest possible despatch to Bombay of 100 engines to work on the Bombay Peninsula line. The letter, No. 117, Railway, dated 25th August, sent by my honourable colleagues from Simla, explains at length the reasons on which we recommend that these engines shall be purchased on account of the State and treated as the State reserve; and that they be hired only to the Great Indian Peninsula Railway. The telegrams from Simla and from Poona ask that these engines may be sent out as they are ready, and that extra payment be made for early deliveries. The alleged corruption among station-masters was discussed at our conference; it appeared that the evil had not been so general as I had been led to suppose. The establishment of a syndicate of traders at every large station to watch and regulate the allotment of waggons is said to be acting as a safeguard against corruption. Such syndicates were recently formed in the Central and North-west Provinces under the orders of the Government of India, and their usefulness will doubtless increase.

* By the latest Custom House return about 400 tons of seed and grain were leaving Bombay daily by sea.

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12. Since leaving Poona I have learned by telegraph that the deliveries of grain to the Madras Railway at Raichore are still below the stipulated 900 tons. The Bombay Government explain that the higher prices ruling in the Bombay Deccan induce dealers to consign grain thither rather than to Madras. Market quotations undoubtedly show that prices in the Deccan and Hyderabad country are dearer than in the Bellary district; and while this continues there is soundness in Sir Richard Temple's deduction that Bellary food-stocks must be larger than the Deccan stocks. The recent very favourable rain in Khandesh and Guzerat has been followed by a heavy fall in wheat quotations in Bombay; and the improvement in crop prospects caused by showers in parts of the Deccan may partially bring down prices there. But for the present all we can do is to give preference, up to a certain extent, at Nagpore and Jubbulpore stations, to grain consigned for the Madras Railway. This we have requested the Bombay Government to do. But meanwhile, until relief comes, either from fresh harvests or by the arrival of additional engine power, the working of the Great Indian Peninsula Railway, and its due delivery of the required quantities of grain in the famine country, cause anxiety, and require careful watching. The Government of India and your Lordship may confidently rely on Sir Richard Temple's efforts to secure a good result; and I may add that the officers of the Great Indian Peninsula Company are actively exerting themselves in co-operation with the Governor.

13. On the 25th August I was met, on my way to Bellary, by the Resident at Hyderabad, who confirmed personally what he had a few days previously reported by telegram and letter regarding the distressed condition of four districts in the south of the Nizam's Dominions. Copies of the Resident's communications, respecting the Hyderabad country and Berar, form Enclosure No. 3 to this letter. Those papers show that the autumn food crop has absolutely failed in the districts of Raichore, Lingsagur, Goolburga, and Shorapore with a population of 800,000; that the price of the commonest grain is 7 lbs. per rupee; that 70,000 people are now supported by the Nizam on relief works, or gratuitously; that the pressure must last till February; while if the October rains fail it may endure until August 1878; that the Nizam's expenditure on famine relief, and his loss of revenue, already amount to nearly 50 lakhs of rupees; that, if the worst comes, the total cost of the famine may reach three millions sterling; that the Nizam's treasury is empty; and that the Minister will probably apply to the British Government for a loan wherewith to defray his famine expenditure. The proposal for a loan will be considered by the Financial Department when it is actually made. If good rain comes during September and October the situation in Hyderabad will greatly improve; and until fuller information is received we may hesitate to accept the estimate that the famine can under any circumstances cost three millions sterling. But, even if the coming monsoon be more favourable than the past, still the distress in the Nizam's Dominions materially aggravates the difficulties of Kurnool, Bellary, and Sholapore.

Nos. 178–9.

14. The Resident had previously reported that distress was impending in the Akola District of Berar. Copy of his report and its enclosure, with the orders passed thereon, forms Enclosure No. 3 to this letter. Happily good rain has fallen in Berar since the Resident's report was written; and Sir Richard Meade was able to assure me, at our meeting on the 29th August, that fears of scarcity in Berar were for the present removed. The caution I have given against beginning relief works too early, and against opening scattered petty relief works at the commencement of a scarcity, will, I trust, be observed if threatenings of drought should again appear.

Nos. 180, 193.

15. I reached Bellary on the 25th August, and the next day visited the large relief camp in that district, which then contained about 4,000 inmates. Among them, especially in the hospital sheds, was a considerable proportion of children and old people, who had been much reduced by want and its attendant diseases. Among the small children were some in a very pitiable condition; they had manifestly suffered from hunger; and it was said that in some cases parents had intentionally abstracted the meal supplied to the children. Nearly half of the inmates were apparently in good condition, and ought to have been at work. The weekly death-rate was very high, over 500 per mille per annum; but then it is to be remembered that into these camps are collected the sickly, the very old, the very young, and in fact the people who in ordinary years furnished the mortality of the whole community. In immediate executive charge of the camp was a Bengali Assistant Surgeon, who seemed to be doing his part of the work admirably.

16. I was impressed by the fact that the Bellary District had in the ground a certain amount of early crop, which, if fertilized by rain during the fortnight following our visit, would yield a substantial addition to the food supply of the country. The reports show that the breadth of this early crop in the southern and western taluks of Bellary is large, and its condition more flourishing than in the parts we visited. Telegrams received since we left Bellary report that good rain has fallen there. Fortu-

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nately the prospect of Bellary for next year does not depend on the crop now in the ground; the great food (millet) crop of Bellary, and also its cotton crop, are sown in September and October; the millet ripens in January and the cotton is plucked in March. If the rainfall of September and October is good, Bellary (and the rest of the Ceded Districts) will be again prosperous by the end of February.

17. Leaving Bellary on the 28th I reached Madras on the following day. That evening I visited the relief gangs on the short junction canal near Government House. The labourers were in very good physical condition. On this, as on other relief works in the Madras Presidency, task work is practically not exacted; the hutting and conservancy system was good, but the labourers were supplied with food considerably in excess of their customary diet in ordinary years. Before passing from the subject of the relief arrangement at Madras, it may be mentioned that, in company with the Governor, I inspected the Palaveram Relief Camp with its 8,000 inmates, the Monegar Choultry Relief Camp with 3,400, and the Red Hills Camp with 6,000 inmates. At each of these relief camps, and especially at the first two, the arrangements were good, the camps were clean, the people were orderly, the hospitals were well kept; but, at the very least, half the inmates were strong enough and well enough to have been employed on relief works, instead of living in almost enforced idleness on, what is to them, a high diet. In this respect the Madras relief camps appear to me to fall far short of what economically managed relief camps should be. The weekly mortality in the camps is high, as at Bellary; and this mortality is principally among new comers; persons who are found dead or dying outside the camps being reckoned into the death-rate of the camp. These deaths betoken insufficient relief in the tracts from which the people come wandering into Madras. From the South Arcot district wanderers have recently begun to flock into Madras in considerable numbers, and to that district the Madras Government is now despatching Mr. Puckle, a member of the Revenue Board, to inquire into the matter.

18. One subject which engaged my attention while at Madras was that of soliciting private subscriptions in aid of relief funds. A telegram had been sent to the Lieutenant-Governor of Bengal on 12th August, in which the Government of India in brief terms deprecated any such appeal on the part of Government, and it appeared from some correspondence between the Lord Mayor of London and the Local Relief Committee at Madras that misunderstanding existed as to the real views of the Government on the subject.

19. A copy of the letter, which, in continuation of the telegram of 12th August I caused to be addressed to the Lieutenant-Governor of Bengal in elucidation of these views, forms Enclosure No. 4 of this letter. It is briefly to the effect that while the Madras Government have undertaken to save life by all available means in their power, and while their own organization is strained to the very uttermost in the attempt to carry out this object, it is not desirable that any committee for the distribution of private charity should attempt to carry out the same objects on the same lines and through the same agency as the Government. In other words, it is undesirable that a relief committee should interfere with the ordinary relief organization of Government. Further, it is not proper or expedient that the Government should ask for private subscriptions to supplement its own expenditure on famine, especially as it is clear that such subscriptions can make no appreciable difference in an expenditure which exceeds half a million sterling a month; and because general taxation, falling chiefly on the very classes who might be expected to subscribe, must in the end be required to provide for this expenditure. No. 199.

20. It must here be observed that, although the meeting held at Madras for the purpose of appealing to private charity in aid of famine relief was presided over by the Governor of that presidency, and attended by all the members of the Local Government, yet this meeting took place without the knowledge of the Government of India, or any intimation by the Governor to the Viceroy of the motives and objects of it. These the Government of India was left to gather from the newspaper reports of the proceedings on that occasion; according to which it had been stated or implied by the majority of those who addressed the meeting that the Government of Madras could no longer hope to feed the increasing number of its famine-stricken population; that, in its efforts to do so, it was inadequately supported by the Government of India; and that, thus, necessity had arisen for appealing to private charity in aid of those efforts. It was impossible to know how far these views and statements were approved by the high authorities of the Madras Government in whose presence they had been forcibly expressed. But the Government of India was bound to repudiate all concurrence in them when called upon by other Local Governments to declare its own opinion on the subject of private charity in connexion with famine relief.

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21. This was done by the Government of India in the telegram above referred to; but in that telegram the Government distinctly stated that, if private charity could be applied to other methods of relief, and could be made to reach other classes than those which came within the reach of State agency, and if this could be attained by a volunteer organization apart from that of Government, then there could be no objection to unofficial meetings for the furtherance of such objects. In our opinion, however, the interests of the public, no less than the duties of the State, required that these objects should be strictly defined, and intelligibly announced, in connexion with some previously ascertained and well considered means of securing their attainment before the authority of Government could be legitimately or conveniently associated with the collection of private charity for the relief of national distress. This view has now been reiterated; and it has been again explained that, while it is not desirable in the circumstances above mentioned for the Government itself to take any part in the collection or distribution of subscriptions, every encouragement should be given to the spontaneous flow of private charity. It has also been pointed out that our objection to inviting subscriptions from those who will hereafter have to be taxed for the same object does not apply to subscriptions from England; and finally, as the Madras Committee, of which the Duke of Buckingham is the chairman, has expressed its intention of directing the money subscribed to objects other than those which come within the scope of Government agency, his Grace has (Enclosure No. 5) been invited to formulate definitely and in detail what those objects are to be, and the agency through which they are to be attained.

No. 200.

22. Much discussion has taken place during the past week on the working and the requirements of the Madras Railway. Seventeen additional engines and one hundred waggons have during August been borrowed from other lines and sent to Madras; one hundred more waggons will shortly arrive from the Baroda line. The Madras Railway is receiving from England six to eight new powerful engines per month; 200 metre gauge waggons are on their way (some have actually arrived) from State lines for work on the South Indian Railway. The double line from Madras to Arconum has been opened for traffic. The despatches of grain from the Madras Terminus are reaching 1,800 tons a day, while the despatches inland from Negapatam and Beypore are keeping up to the mark. I anticipate that the several Madras railways will, if grain be consigned in sufficient quantities, despatch inland the full quantity required daily, namely:—

	Tons.
From Madras Terminus by the Madras Railway - - -	1,800
„ Beypore - - - - - - -	400
„ Raichore - - - - - - -	900
By the South Indian Railway - - - - -	800
„ canal and road from Madras - - - -	600
Total - - -	4,500

Under these circumstances the Government of India have for the present refrained from compelling other guaranteed lines, by forced Government requisition, to lend more rolling stock than they can willingly spare to the Madras Railway; and we are the more anxious not to make requisitions, if it can possibly be helped, because the other railways have loyally obeyed our request for loans of rolling stock as far as they possibly could; and because we do not know what urgent need may spring up for grain transport in other parts of the empire which are threatened with scarcity.

23. Though the Madras Railways, by working full power, can thus almost meet the necessities of the case, yet it is by no means certain that they can continue to do so, or that they will be prepared for new demands which may arise if the north-east monsoon fails. Some of their engine and waggon stock is very old, and may become unserviceable before the crisis is over; the northern railways may, if difficulty comes in Upper India, have to reclaim the engines they have lent. In order, therefore, to provide against possible difficulties we have telegraphed to your Lordship supporting the Madras Government in their indent of the 17th August for 20 more engines, 600 waggons and 40 break-vans; and we have asked for 20 more engines in addition to the Madras indent. You have informed us by telegraph that 500 of these waggons will reach India within ten weeks time. We hope that this additional stock, together with 30 new heavy engines now arriving, will enable the Madras Railways to meet all emergencies. We have asked that the 40 new engines should, for reasons explained in my colleague's railway letter, quoted in paragraph 10 of the present letter, form part of the State reserve of engines.

24. It has been mentioned that the railways will carry the required amount of grain, if only it is consigned by the trade. And upon the question whether private trade will

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send into the famine country all the grain that is required, the safety of the people depends. It cannot be said that the trade sends all the country can take; for the dear prices ruling in so many districts would show that more grain would be readily bought, if sent. But this much is certain, private trade is still consigning to the famine country much more grain than the railways can carry into the interior. In previous letters we have reported that more than 100,000 tons of grain are awaiting despatch at or near the railway stations in the Central Provinces. The Bengal exportable surplus, if the crop now in the ground turns out well, will not fall short of 350,000 tons. Already 100,000 tons of freight, chiefly steamer freight, has been taken up for despatch of grain from Calcutta to Madras ports during the present month. The actual despatches of rice from Bengal to Madras were 53,225 tons, or an average of 3,800 tons daily, during the fortnight ending on the 29th August. The despatches from Burmah to Madras were only 400 tons during the same period; so that there would seem to be truth in the opinion generally expressed by merchants, that the Burmah rice ports have no more grain to send till next crop comes to market in December. From Saigon it was reported that 150,000 tons were ready for export, but that most of this would go to China, where also there is a large famine demand. But a telegram from the Governor of the Straits Settlements, dated the 1st September, has told us that the Siamese Government has prohibited the export of rice from Bankok until the 30th September, on account of the threatened dearth in those territories. At the same time the Persian Government has prohibited grain exportation from Bushire. It would seem, therefore, that for the present India cannot expect food supplies from further Asia, but must send the surplus of the north to supply the deficiency of the south. For the present, and so far as we can foresee, any grain imported by Government would occupy railway waggons to the exclusion of private despatches, and would paralyze trade to an indefinite extent.

25. On my way to Madras I received a report from the Lieutenant-Governor on the prospect of the autumn crops in the North-West Provinces and Oudh. His account was, in brief, that the early (July and August) rains had failed over large tracts of the North-west Provinces; that over the Agra, Meerut, and Jhansi Divisions, and over a great part of Rohilkund and Oudh, the unirrigated autumn crops either had not been sown, or had withered, and that the irrigated crops had been much scorched by the hot dry westerly winds. The redeeming features of the situation were, that the autumn crop in the Allahabad and Benares Divisions, though in jeopardy, would still be saved if rain came; that the food stocks in the country were very large, and that there was still ample time for the rain to come and secure good spring crops, which yield the larger food harvests of the year. It was explained that Sir George Couper had given direction to Commissioners to open relief works of certain classes as soon as they deemed such a course necessary. The Lieutenant-Governor's report will be found in Enclosure No. 6, No. 169. together with the orders passed by the Government of India on the subject. It will be No. 194. seen that, while commending the North-West Provinces Government for its foresight and the caution given against alarmist views, I have desired a reconsideration of the orders permitting the commencement of petty relief works in many parts of the country; and directed that, if relief employment is to be a charge against the general treasury, such employment should be given on fully supervised large works of permanent usefulness. It was mentioned that the Government of the North-West Provinces possessed ready to its hand complete projects for several such works, on which, if need be, relief employment could at once be given.

26. From the Resident at Baroda I learnt that a serious failure of the autumn food crop was impending, and that prices were already rising to famine rates (twelve pounds per rupee). An interesting and suggestive letter was received from Sir Madhava Rao, the Baroda Minister, on the same subject. The Minister's recommendations were, in effect, that relief works should be opened simultaneously, and a uniform famine policy adopted all over the Baroda country, over British Guzerat, and over the Kattywar Chiefships. It was urged that trade in grain should be everywhere exempted from transit dues, and that nowhere should grain exports be prohibited. The Minister went further, and recommended that Government should purchase and import grain from other parts of the world. In my Secretary's reply the Resident was furnished with a copy of the orders sent by Sir Richard Temple to the officers of British Guzerat, directing that projects for well-considered public works should be at once prepared, but forbidding the opening of relief works so long as the people could support themselves. The Resident was reminded that the ryots of Guzerat were exceptionally prosperous; that last season they had excellent harvests and high prices, and he was cautioned against opening petty relief works or beginning gratuitous relief at all for the present. The attention of political officers attached to the neighbouring States was called to the

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desirability of all the Chiefs adopting the British principle of admitting free passage of grain from, as well as to, tracts threatened wth scarcity. At the same time the Minister was thanked for his suggestions; he was told of the steps taken by the Government of India to make known the state of prices in Southern India throughout adjoining provinces and countries; and it was explained that the Government would not engage in the business of importing grain. The advice given to Native Chiefs regarding free trade in grain has already borne some fruit; for Major-General Sir Henry Daly telegraphs from Indore that his Highness Maharaja Holka has agreed to withdraw the prohibition against grain exports from his territory, and that at least one other Chief of Central India has followed the Maharaja's example.

27. I propose to start to-night for Bangalore, in order to confer with the Chief Commissioner on the state of affairs in Mysore, the actual condition of which, as well as the future prospects of that State, are subjects of very grave anxiety to me. Since the date of the last weekly telegram the prospects have not improved; and day by day the burden of the telegrams has been that no rain has fallen. Last evening, however, brought better news, good rain being reported to have fallen on the 2nd instant. Prices of food-grains show no material alteration. The last report received from Mysore shows the number on relief works slightly diminished, and the number on gratuitous relief considerably increased. The following are the totals: on relief works 49,000 persons, on gratuitous relief 213,000. These figures, no less than the reports previously received, indicate very clearly that the famine organization in Mysore is unable efficiently to cope with the distress; and the radical error of the system may be gathered from the fact that, out of a total of 264,000 persons receiving relief less than 23,000 are on works professionally supervised. The latest Mysore weekly report forms Enclosure No. 7 to this despatch.

28. As a first step towards introducing improved organization, I have deputed two selected officers from the North-West Provinces—Mr. C. A. Elliott, Commissioner of Meerut, and Major Scott Moncrieff, R.E., to assist the Chief Commissioner, and I have also deputed five military officers to assist in controlling relief operations. A detailed scheme for providing public works, and for reorganizing gratuitous relief, will be framed after discussion with the local administrative officers at Bangalore.

29. The Chief Commissioner of Mysore has made an application to the Government of India for a loan of 50 lakhs to meet the famine expenditure. The expenses of the famine have hitherto been defrayed by the proceeds of the invested funds, amounting to 46,16,000 rupees. This source of supply will be exhausted by the end of the current month, and the budget shows no balance to fall back upon. The Government of India have agreed to grant the loan, as, otherwise, the Mysore State would be compelled to borrow in the open market, a policy which the Government is not prepared to accept in the case of any Native State; and the loan will be granted on terms to be fixed hereafter, in the following instalments:—

In October - - - - -	20 lakhs.
„ November - - - -	15 „
„ December - - - -	10 „
„ January or February - - - -	5 „

30. Until the beginning of September, the condition of affairs in some of the Central India States, especially Gwalior and the Bundelkund country, was getting worse and worse. Already there was a demand for relief labour in Gwalior; emigration was beginning, and strings of emigrants were passing down the Indore road, some hundreds of whom received a meal at Goona. To relieve this pressure, relief employment has been opened on the further section of the Agra and Gwalior railway. Sir Henry Daly, the Resident at Indore, telegraphed on the 29th August that the commencement of work on the railway had temporarily checked the emigration. Work on the Pahlunpore railway, recently sanctioned by your Lordship, was also arranged, as a relief measure to relieve the pressure in that part of the country; which pressure is, according to latest telegrams, now much enlightened by the favourable rainfall of the past week.

31. The season telegram despatched to-day to your Lordship is as follows:—

Madras.—One to 1½ inches rain. Bellary, Kurnool, Cuddapah, much benefit; good rain Ganjam, Vizagapatam, Kistna; thunderstorm at Madras; one inch rain at Madras on 4th. Only half an inch elsewhere, save where occasional heavy showers, crops improved by rain, except in South Arcot, Coimbatore, Salem, Madura; prices dearer; 901,227 on works, 1,430,885 on gratuitous; grain importations large, railway transport improving.

Bombay.—Showers throughout week everywhere; four inches rain all over Guzerat; continuous heavy rain all Konkan districts; good rain throughout Khandesh, Nasik,

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Sattara, Belgaum, and greater part Poona, Sholapore. Partial rain, Dharwar, Kaladgi. Prospects much improved. Prices not yet cheaper. Numbers on works 278,731, on gratuitous 125,960.

Mysore.—Bad week, occasional light showers; good rain Bangalore, night. second September gauging 1½ inches; dry crop prospects worse in all districts, gratuitous numbers 213,000, works number 49,000.

Hyderabad.—Three days' good rain, over four inches. Much benefit. Good rain Berar.

Rajputana.—Heavy rain Aboo and South-West States. Good rain Jeypore. Heavy showers Ajmere, Meywar, and East States. Lyall telegraphs general prospect very materially improved. More rain needed Ulwar, Meywar.

Central India.—Good rain Rutlam, Indore, and all Malwa. Two inches rain Neemuch, Gwalior, Bundelkund, too late to save much autumn crop Gwalior. Still prospects everywhere improved.

North-West.—Moderate rain Allahabad, Benares Divisions; four inches Jhansi Division; half inch Agra; good rain one day Meerut and Bareilly; rest slight partial showers. Autumn crop lost many parts.

Panjab.—Dry hot weather up to second, then heavy universal rain over province, gauging 9½ inches at Loodhiana, too late to save autumn crop in parts. Lieutenant-Governor telegraphs prospects immensely improved, spring crop sowings secured over the important grain-producing districts.

Bengal, Central Provinces, Burmah, Assam.—Seasonable weather, good prospects.

It has given me great pleasure to be able to address to your Lordship so satisfactory a telegram. But I cannot forget that, although our prospects are almost everywhere so much better than they were when I left Simla, yet everything in the Madras Presidency depends mainly on the October rains (north-east monsoon). The condition of Mysore is still a matter for much anxiety; and our hope for the future can only be fulfilled by a continuance of the present favourable change in the weather.

I have, &c.
(Signed) LYTTON.

No. 216.

No. 34 of 1877.

From the GOVERNOR-GENERAL OF INDIA, Department of Revenue, Agriculture, and Commerce, to the SECRETARY OF STATE FOR INDIA, Madras, September 5, 1877.

In my letter, No. 33, of to-day's date, I have laid before your Lordship some account of the journey I have undertaken to Madras accompanied by my colleague, Sir Alexander Arbuthnot, together with a brief summary of the latest changes in agricultural prospects over the several provinces of the Indian Empire. In the present letter I shall confine myself to a description of the arrangements concluded, after personal conference with the Governor, for the purpose of systematizing the policy and strengthening the administration of State relief throughout the famine-stricken districts of the Madras Presidency.

2. My Minute dated the 12th August submitted to your Lordship with our letter of the 20th August, contained a review of the situation which the Government of India had been dealing with up to the date at which that Minute was written, and of the famine policy pursued by us in reference thereto; with a general indication of those changes in the relief operations of the Madras Government which appeared to myself and my colleagues urgently needed by the protracted duration and increasing pressure of the famine in this part of Southern India. No. 131.

3. The general rules of famine policy set forth in my above-mentioned Minute are in complete conformity with the views previously expressed in the instructions to Sir Richard Temple of the 16th January last, which were approved by your Lordship. Abstention from interference with private trade and from Government operations in the grain market; employment of the destitute upon useful well-supervised public works; careful supervision of gratuitous relief, and the restriction of it by applying needful tests to recipients, are principles which have been steadily inculcated by the Government of India as opportunity arose since January last. But, although from the facts and figures laid before us by the Madras Government, it appeared to us that its conduct of relief operations was not in complete accordance with the principles thus laid down by the

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Government of India, we had nevertheless many reasons for believing that the partial disregard of those principles would be on the whole less mischievous in its ultimate effects than the friction, irritation, and general paralysis of effort likely to arise from authoritative interference with the action of the Local Government. From such interference therefore, in reference to all matters not of paramount importance, we purposely abstained so long as it was possible to do so; that is to say, until the failure of the summer rains of 1877 had made it clear that famine relief and famine expenditure on a large scale must continue in the Madras Presidency till December or January next.

4. The Madras famine then assumed dimensions which placed it altogether outside the category of local calamities. It had become one of the most serious imperial disasters which the Supreme Government had ever been called upon to deal with. Under the existing constitution of the Government of India there must always be a certain amount of divided responsibility in dealing with any great catastrophe of this kind. For while a large executive responsibility is advantageously exercised by the Local Governments, the financial responsibility of the Government of India remains inalienable. In ordinary circumstances this financial responsibility involves the severest and most minute scrutiny of all expenditure. But in exceptional circumstances such as those created by the pressure of a great famine, that scrutiny cannot be enforced without extreme inconvenience. Owing to the delay caused by the requisite investigation of details, and protracted correspondence between the Supreme and Local Governments irremediable disasters might occur before the measures necessary for preventing them could be sanctioned and undertaken. Thus on occasions like the present we find ourselves placed in the anomalous position of a Government which is practically obliged to relax the exercise of its financial control in proportion to the increasing gravity of its financial liabilities. Such relaxation of control, however, is only justifiable so long as the limits of expenditure can be foreseen. When this is no longer the case, when uncontrolled expenditure threatens serious and imminent peril to the finances of the Empire, then the Government of the Empire cannot suspend or transfer to any other authority that financial supervision which constitutes its most essential function without repudiating the paramount duty of an Imperial Government. How to reconcile due guarantees for the discharge of the financial responsibility devolving exclusively upon the Supreme Government with adequate provision for the freedom and celerity of action so greatly needed to ensure the success of the Local Government in coping with the present grievous calamity is a problem which pressed for early solution, and I am hopeful that it may have been adequately solved by the arrangements now concluded with the valuable advice and assistance of the Governor of Madras.

5. The object to be attained was twofold. On the one hand it was necessary to secure for the Government of India that consideration of its views on the part of the Government of Madras, which is strictly demanded by the impossibility of transferring to the latter any portion of the financial responsibilities of the former. On the other hand, it was no less necessary to do this, in some manner involving the minimum of friction and delay, and calculated to strengthen rather than weaken the executive action of the Local Administration.

6. Great rapidity of reference would doubtless have been secured, and much time saved in the conduct of official correspondence between the two Governments, by temporarily transferring the seat of the Supreme Government to this Presidency. But to the Duke of Buckingham and to myself such a measure seemed open to many and grave objections which heavily counterbalanced the advantages of it in that respect. On the other hand, it appeared to me, after much anxious consideration, that if some means could be devised of placing at the command of the Local Government all the higher consultative and executive ability and experience which, owing to its unrestricted field of selection and authority, are in ordinary times commanded only by the Government of India, then the Government of India would be justified in reducing to a minimum all checks upon the action of the Local Government; because its own responsibility in reference to such action would under these conditions be sufficiently represented and practically secured by the selection of subordinate agents.

7. For the adoption of this latter alternative, which commended itself no less to the judgment of the Duke of Buckingham than to my own, I placed myself in personal communication with his Grace. The Duke informed me that he would gladly receive in pursuance of our common object the assistance of Major-General Kennedy, who had accompanied me from Poona, and whose services Sir Richard Temple was kind enough to place temporarily at my disposal. Major-General Kennedy, who is favourably known to your Lordship and to the Government of India as Public Works Secretary to the Bombay Government, has under two successive Governors successfully directed all

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famine relief operations in the Bombay Presidency. I considered that Major-General Kennedy's advice would be of great use to the Government of India, and that were his services accepted by the Government of Madras he would be most valuable in helping to organise and carry out the difficult but necessary operation of transferring to large and permanently useful works the greatest possible proportion of the 2¼ millions who were being supported by the State in the Madras Presidency, and of whom barely one-quarter of a million were doing useful work. The Government of India is under great obligations to Sir Richard Temple for thus sparing the services of his chief famine officer, and a copy of a communication conveying to his Excellency the expression of our thanks for this loyal service forms Enclosure No. 1 to my present letter. No. 208.

8. On the evening of the 25th I met the Governor of Madras by appointment at Bellary. Before meeting his Grace I had sent him a copy of my Minute of the 12th August, and had confidentially communicated to him my views as to the necessity for certain changes in the relief management which could only be effected by improved unity and directness of control. In that opinion his Grace fully concurred, and our interview at Bellary left no essential difference between us as to either principles or measures. On the following day the Duke of Buckingham returned to Madras, where he had to attend a meeting of Council, and where I rejoined him on the 27th.

9. The day after my arrival at Madras I had a long conference with the Governor, at which my colleague Sir Alexander Arbuthnot, Major-General Kennedy, and some of my secretaries were present. We considered, proposal by proposal and clause by clause, a memorandum with which I had furnished the Duke, on the principles and measures commended to his adoption by the Government of India. These measures included only one important change of system which the Governor of Madras was unwilling to accept, viz., that the famine districts should be divided into two or more commissionerships, each under a Commissioner acting as chief executive officer in his division. The Governor of Madras held that it was unwise to take his best Collectors from their districts to be Commissioners; that it was doubtful whether functionaries with such extensive charges as those assigned to the Madras Collectors would work well under Commissioners, and that what was required in the way of inspection and enforcement of Government orders could be done by deputing members of the Board of Revenue from time to time to visit particular districts, without assigning to them any definite territorial charge. On that point my own opinion and that of my colleague Sir Alexander Arbuthnot is unchanged; but we did not deem the point essential, and have not pressed it.

10. With this single exception, complete concurrence of opinion and purpose was happily established between the Government of India and the Government of Madras, whose final conclusions were expressed in their Secretary's letter No. 2,232, dated the 31st August. The letter, together with the orders passed thereon by the Government of India, will be found in the "Gazette of India Extraordinary," published on the 3rd September, Nos. 201–3. which forms Enclosure No. 2 to this letter. The principles of famine policy thereby affirmed are:—

I. *Grain Supply.*—That the Madras Government should abstain from importing grain on its own account, and from any measure which might interfere with the activity of private trade.

II. *Public Works.*—A large scheme of useful public works under professional supervision should be the backbone of the relief system; all other forms of relief being subsidiary to the main scheme, and all relief works of any magnitude being directed and controlled by agency belonging to the Public Works Department. Large works under professional agency should not be limited to works which are deemed directly remunerative, nor even to works which may probably be finished during the continuance of the famine. The Governments of India and Madras will be prepared to accept a proportion of unremunerative and unfinished public works at the end of the famine.

III. *Gratuitous Relief.*—All gratuitous relief should be as far as possible temporary, and subsidiary to the main object of getting the distressed people on to the works or back to their ordinary occupations. It will be necessary to maintain relief camps in order to receive and support the starving, the helpless wanderers, and infirm persons, with a view of getting them into condition to labour. But the ultimate object of these relief camps as receiving places only for people hereafter to be drafted to works should ever be kept in view. Village relief, other than casual relief to famine-stricken travellers, should be confined to resident villagers who are house-ridden, or otherwise unfitted for or incapable of labour.

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11. To carry out this policy the hitherto existing system of administration in Madras was indisputably too cumbrous. Under that system the Collectors reported on most famine subjects to the Board of Revenue; the Board, and in some instances the local officers, reported to one or other of four different branches of the Secretariat; the references so received from the Board or the local officers were then minuted upon by the two members of Council; and not till they had thus at last reached the hands of the Governor could they receive the orders of his Excellency in Council. It seemed to the Government of India, and in this view the Government of Madras entirely concurred, that under such a system the administrative chain was too long, that control was weak, and that uniformity and promptitude of action was hopelessly unattainable. In presence therefore of the increased and increasing difficulties which the action of the Madras Government, thus retarded and dispersed, had been unable to counteract, it was deemed absolutely necessary to concentrate the direction and simplify the process of its famine business by placing it within the immediate control of a Famine Dictator, who, acting under the general authority of the Government of India, should be solely responsible for the administration of this department.

12. By none but the head of the Local Government could such a task be properly assumed or adequately discharged. It was therefore decided, that by rules passed under the India Council's Act, the Governor of Madras should take the famine business into his own hands, as was done by Lord Northbrook during the famine of 1874 in Bengal; that Collectors and executive officers should correspond with the Government on famine matters direct, and not through the Revenue Board as heretofore; and that Major-General Kennedy, acting as the accredited agent of the Government of India, should be appointed personal assistant to the Governor in all famine affairs. The object of this arrangement (to which great importance is attached by his Grace the Governor and by myself) is to associate the authority of the Supreme with that of the Local Government without abrogating the responsibility of the former or hindering the action of the latter.

13. These measures, as settled between the Governor and myself, have been loyally accepted by the other members of the Madras Government. I do not expect from them, either now or hereafter, a complete recovery of the whole ground already ravaged by the growth of famine; but I feel assured that they will greatly facilitate remedial operations and restrain the progress of positive pauperism. The Government of India has given to the Government of Madras the services of one of the very best famine officers in India; and we have arranged for the immediate despatch of all the engineering, executive, and medical* assistance required by the Local Administration. The Supreme Government, relieved from all necessity for detailed supervision or vexatious interference, will spare no effort to assist the free and more vigorous action of the Madras Government, in following out the broad lines of famine policy now accepted. The Governor of Madras becomes virtually a dictator in famine affairs, so far as the constitution permits such an arrangement, and I have every reason to anticipate great amelioration in the social and financial conditions of the Madras famine from his Grace's more direct control of the operations which will now be commenced.

* On our journey an urgent demand reached me by telegraph for 100 additional medical subordinates for Madras. Bengal had already lent 88 such officials. At the present time of writing over 62 out of the additional 100 have been arranged for, and some 20 have actually arrived in the Madras Presidency.

14. The letter from the Government of Madras, which will reach your Lordship by the present mail, gives the latest available information on relief affairs. It will be seen from it that there are now in this Presidency two and a quarter millions of persons in receipt of gratuitous relief, and on relief works; most of which works are under no adequate control, nor are they of such a character as to promise any great permanent benefit to the country.

15. It only remains for me to express the hope that the arrangements reported in this letter and its enclosures will meet with your Lordship's approval, and to record my warmest acknowledgments of the cordiality and ability with which I have been assisted by the Duke of Buckingham in bringing these arrangements to a prompt, and I trust a satisfactory, conclusion.

I have, &c.
(Signed) LYTTON.

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No. 217.

Telegram, dated 6th September 1877.

From PRESIDENT, Simla, to the SECRETARY OF STATE FOR INDIA.

Viceroy approving, we wish public works engineers on furlough, under rank of superintending, and medically fit, warned to be ready to return to India on further intimation.

No. 218.

Telegram, dated 6th September 1877.

From SECRETARY OF STATE to DUKE OF BUCKINGHAM.

Yours 2nd instant. I am very glad to learn the satisfactory arrangements that you have made with Viceroy. We hope much from concentration of famine administration in your hands. I understand Viceroy has urged on you greater stringency in confining gratuitous relief to those unable to work. I have no doubt of the propriety of this recommendation, but, as it implies requirement of task work from all who can do any work at all, the greatest care in executing it will be necessary in the case of those who have been reduced to feebleness by long privation. Mortality may result if sufficiency of nourishment is made to depend on work beyond their strength; moreover, amount of nourishment which was sufficient when they were strong may not be sufficient now.

No. 219.

Telegram, dated 6th September 1877.

From SECRETARY OF STATE to VICEROY.

I have heard with great satisfaction of judicious arrangements concluded between you and the Duke of Buckingham. I believe that concentration of famine management in his hands will be of greatest advantage. The appointment of General Kennedy, in whom you repose well-grounded confidence, will also be very beneficial. I approve generally of your arrangements, reserving any observation I may have to make on matters of detail. Greater stringency in confining relief to those unable to work is no doubt in many places necessary, but every precaution should be taken that consequent requirement of task work is not allowed to press dangerously on those who by privation have become partially incapacitated for labour. I have telegraphed in this sense to Duke of Buckingham.

No. 220.

Telegram, dated 7th September 1877.

From SECRETARY OF STATE to VICEROY.

State locomotives ordered for delivery here: in October, 10; November, 13; December, 44; January, 27; February, 19; March, 7. These fill up four largest makers, who have in consequence shunted English orders.

Additional 20 locomotives specified in yours 5th, being novel type, cannot be made quickly. If quick delivery desirable, discretion must be left with me in selection of type, for which drawings and patterns are ready to hand, for instance, Great India Peninsular type; new pattern locomotives cannot be delivered under 16 weeks from date of completion of drawings; complete drawings of State type not yet copied.

Additional engines that type cannot be delivered before 2nd of January. On all present orders extra price is given for quickest possible delivery.

No. 221.

Telegram, dated 8th September 1877.

From VICEROY to SECRETARY OF STATE.

Yours 7th. Type locomotive left to your discretion. When could 20 additional for Madras be delivered?

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No. 222.

Telegram, dated Bangalore, September 8, 1877.

From Viceroy to Secretary of State.

I have arranged with Arbuthnot to take the management of the famine business of the Government of India into my own hands.

Encl. in No. 239.

No. 223.

No. 821 (Famine), dated Bangalore, 8th September 1877.

From S. C. Bayley, Esq., C.S.I., Additional Secretary to the Government of India, to the Chief Commissioner of Mysore.

I am directed by his Excellency the Viceroy and Governor-General, in pursuance of the result arrived at in this day's conference, to issue the following instructions for the guidance of your administration in famine affairs.

2. His Excellency deems it unnecessary to criticise the action of the past; but he finds from recent returns that the numbers now on gratuitous relief are 213,710; that there are on works managed departmentally 22,975, and on works managed by civil agency 25,644. It appears very doubtful if any considerable proportion of the people employed on departmental works can be considered as "relief labourers" in the ordinary sense of the term, and the works under civil agency are petty works, which experience has shown to be but little suitable to famine operations, and to be specially difficult of supervision.

3. It is also manifest that, owing to the want of sufficient relief works, the relief camps or kitchens (as they are called) have become crowded to an extent incompatible, under existing organization, with proper discipline or control; that vast numbers are relieved at those places who are quite capable of working; that, in some of them, no nominal register is kept; that different scales of rations are in force in different kitchens, rendering the maintenance of the more economical standard a task of unnecessary difficulty, and that, altogether, there is a serious want of organized and systematic control over them.

4. The principles on which famine relief should be administered are laid down with sufficient distinctness in the Minute of his Excellency the Viceroy dated the 12th August, a copy of which is herewith enclosed, and Lord Lytton gladly acknowledges that the orders issued by you from time to time have been generally in accordance with these principles. It is only necessary that such orders should be more fully developed and acted on.

5. The Viceroy desires that the attention of your administration should be specially directed to the maintenance of a sufficient scheme of large works of public utility for the relief of the destitute population. The works should be managed as relief works, on the task work system, on relief wages, and under stringent tests, such as those in force in the Bombay Presidency, and to these works all persons capable of labour should be drafted both from relief camps and, hereafter, from petty works under civil agency. Petty works under civil agency should also be brought under the general supervision and control of the Public Works Department. The above-mentioned scheme must be the backbone of the relief system, all other forms of relief being subsidiary to it. The entire energy and strength of your Public Works Department, unhampered by the rules and restrictions which ordinarily regulate its employment of labour and expenditure of money, must be devoted to the object thus defined. This must be done at the expense, if necessary, of other works, which may have been sanctioned in the annual budget, but which may not be suitable for relief works. It is not absolutely essential that such works should be remunerative, nor even that they should be such as can be finished during the continuance of the famine; but preference should, of course, be given where possible to works coming under these two categories.

6. The Viceroy is not unaware that, in carrying out this duty, alien as it is to the every-day work of the Department of Public Works, much disturbance of the machinery must take place, involving some deterioration in the discipline of the regular coolies on the establishment, and in the efficiency of the departmental staff, of which Colonel Sankey is now justly proud. But in times of famine, as in war, all ordinary administration must give way to the one main object of the campaign; and the Viceroy cannot permit the convenience or even the efficiency (for ordinary purposes) of any single department to become an obstruction to what he deems the essence of a sound system of relief.

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7. His Excellency regretted to find at the conference that Colonel Sankey, notwithstanding the previous explanation of the views of the Government of India, which the Viceroy had personally given to him, still failed to grasp this principle. Colonel Sankey was apparently not prepared to close any of his ordinary works or convert them into relief works, nor was he willing to divert any of his ordinary departmental staff from these works to the duty of controlling relief works. The scheme of works, moreover, submitted to the Viceroy, was insufficient in itself to receive the numbers which ought, as shown by your returns, to be drafted on to them, whilst at the same time it was mainly made up of petty works ill adapted to the concentration of control, and consequently to the discipline essential to the due execution of relief works.

8. Lord Lytton, therefore, in order to obviate any failure of the policy hereby entrusted to your execution, desires you to forego your budget scheme of public works during the present crisis. Those of the sanctioned works, which are adapted for relief purposes, should be carried on as relief works, and those that are not so adapted must be closed, the departmental establishment employed thereon being transferred to relief works properly so called. His Excellency looks with confidence to your co-operation in carrying out these instructions, which he has every reason to believe are not out of harmony with your own views.

9. All gratuitous relief should be as far as possible understood to be a temporary concession, subsidiary to the main object of getting people when in condition to labour on to the relief works or back to their ordinary avocations. At relief kitchens, *i.e.*, unenclosed feeding places, it is certain that neither can proper tests be applied nor can efficient discipline be maintained. It should be an object, therefore, to confine the gratuitous distribution of food to properly enclosed relief camps where the people may be kept under strict discipline and properly registered, and set to such light labour as they may be able to do. The efficient organization of these camps should receive early attention. It will be necessary to maintain them for some time to receive and support the starving helpless wanderers and infirm persons, with a view of getting them into condition to labour. But the ultimate object of these camps, as receiving places only for people hereafter to be drafted to works or to their ordinary occupations, should ever be kept in view.

It is essential that all relief camps, whether in Bangalore or elsewhere, which are kept up by Government money, should be placed under Government organization, so that one system of control and one scale of rations may be applied to all. The responsibility of Government in this matter cannot with propriety be delegated to an irresponsible committee.

The Viceroy learns that the people in relief kitchens have through long idleness become so demoralized that there will be much difficulty in keeping them on works. It will be necessary for your civil subordinates to give the assistance of the police (taking on if necessary extra men) to maintain discipline in the camps attached to the works. It will also be the duty of those in charge to prevent aimless and uncertain wandering, and to see that people do not leave the works without some security for their being able to support themselves in other ways.

10. Village relief is not given in Mysore. Should it become necessary to give village relief at all, it should be confined to resident villagers who are houseridden or otherwise unfitted for or incapable of labour, and should on no account be given in the shape of cash.

11. In order to assist you in the arduous task of introducing these changes, and of supervising the famine administration of Mysore generally, the Government of India have been pleased to place at your disposal as Famine Commissioner, Mr. C. A. Elliott, C.S., with Mr. Wingate, of the Bombay Civil Service, as your Additional Secretary in the Famine Department.

12. The Famine Commissioner will assist you in directing all famine operations in the provinces of Mysore and Coorg, and, subject to your approval on matters of importance or principle, will issue orders on your behalf through the Commissioners or through the ordinary official channel under the signature of the Famine Secretary. He should have authority when travelling in the interior to give instructions in your name to the local officers, in accordance with the policy of the Government of India and of the Chief Commissioner, such instructions being of course reported to you, and being likewise communicated to the Commissioners of Divisions. The Famine Commissioner should, moreover, have an opportunity of laying his views before you on all correspondence connected with famine matters that may come up to you for orders.

13. The Government of India have already caused to be placed at your disposal the services of five military officers to assist in supervising relief organization, and in addition

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to this the Government will endeavour to procure such assistance in the Department of Public Works as may be necessary, and will also obtain the services of as many medical officers as may be necessary to supply the deficiencies of your staff in this respect.

Encl. in No. 239.

No. 224.

No. 822 (Famine), dated Bangalore, 8th September 1877.

From S. C. Bayley, Esq., C.S.I., Additional Secretary to the Government of India, to the Chief Commissioner of Mysore.

In paragraph 9 of my letter No. 821 of this day's date I conveyed to you the instructions of his Excellency the Viceroy and Governor-General that all relief camps, whether in Bangalore or elsewhere which are supported from Government funds, should be placed under the responsible organization of Government officers.

2. I am to take this opportunity of requesting you to convey to the President and Members of the Relief Committee at Bangalore the sincere thanks of his Excellency the Viceroy for the gratuitous supervision they have hitherto bestowed on some of these camps. More especially does Lord Lytton desire to acknowledge publicly his obligations to Mr. J. D. Gordon, C.S.I., the President of the Committee, who ever since January last has, with unwearied self-devotion, and not without injury to his health, given up his scanty leisure to the difficult and depressing task of controlling these camps, and has continued the work in the face of overwhelming difficulties, caused by the ever increasing numbers of applicants, and the deepening severity of their destitution.

No. 225.

Telegram, dated Bangalore, 9th September 1877.

From Viceroy to Secretary of State.

Yours of 6th. With reference to latter portion I may say that system now established at Madras provides that only those capable of labour are sent to relief works; those who are weakly are kept apart and specially treated, others are tasked at first lightly until perfectly fitted for full work. Bombay people thus treated; experience shows they improve more rapidly than those left idle and demoralized in relief camps. Every attention will be paid to the important consideration enjoined by you.

Encl. in No. 239.

No. 226.

No. 5,788.—Genl. 154, dated Bangalore, 10th September 1877.

*No. 223.

Order.—Ordered that copies of the above letter* be communicated to the Commissioners of Divisions, Deputy Commissioners of Districts, the Deputy Surgeon General, Indian Medical Department, and all executive officers engaged in famine relief operations.

2. The Minute of his Excellency the Viceroy, dated the 12th August last, referred to in paragraph 4 of Mr. Bayley's Despatch, will be published in the supplement of the Mysore Gazette, and the attention of the executive officers of the Administration is directed to the principles therein laid down.

3. The object which the Government of India have in view in their present instructions is, it will be observed, to withdraw from the Government kitchens as large a number as possible of those who are now in the receipt of charitable relief, and to employ them on large public works of permanent usefulness under professional supervision.

4. The duties of Mr. C. A. Elliott, who has been appointed as Famine Commissioner in this province, are stated in paragraph 12 of Mr. Bayley's despatch under reference, and it is necessary only on this point for the Chief Commissioner to direct that all written, or in minor matters of detail, verbal instructions which may be given by that officer direct to the Deputy Commissioners should be promptly carried out. The Chief Commissioner relies on the hearty and loyal co-operation of the Division and District Commissioners in affording to the Famine Commissioner that support which will be needed for the successful accomplishment of his duties.

5. In future all correspondence immediately connected with the administration of famine measures will be conducted in a Special Famine Department to which Mr. A. Wingate, Bombay Civil Service, has been attached as secretary, and reports will be addressed to that officer as "Additional Secretary to the Chief Commissioner, Famine Department."

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No. 227.

Telegram, dated 11th September 1877.

From the Governor of Bombay to the Secretary of State.

Since my telegram 3rd, further seasonable improvement in situation in Bombay Presidency. More rain fallen Sind, Kattywar, Guzerat, Deccan, South Maratha Country, Concan. In some parts of Deccan rain extraordinarily favourable; Poona itself alone suffers protracted drought; good rain in neighbouring territory, Rajputana, Malwa, Hyderabad. Public anxiety much mitigated, but prices high, and severe distress continuing among some classes.

No. 228.

Telegram, dated September 13, 1877.

From Secretary of State to Viceroy.

I am very glad you have taken famine business into your own hands. It is far the most important business before you.

No. 229.

Revenue, No. 64.

From the Secretary of State for India to the Governor-General of India in Council.

India Office, London, 13th September 1877.

Para. 1. The Despatch of your Excellency in Council, dated 16th July, No. 29 of 1877, relative to the famine in the Presidencies of Madras and Bombay, and the Province of Mysore, has been considered by me in Council. No. 79.

2. The general prospect indicated in the Despatch is very gloomy, but recent accounts received by telegraph are more favourable, and I trust that all the affected districts will soon manifest improvement.

3. The discussion between Dr. Cornish and Dr. Lyon on the subject of famine wages, which is based to a considerable extent on theoretical grounds, does not demand remark from me. The local governments possess full discretion to adapt the wages given to the actual necessities of the people.

4. I approve of your orders to the Commissioner of Mysore for the abandonment of the practice of paying labourers on relief works once in 15 days; and for the early substitution of bi-weekly, and when distress is extreme of daily, payment.

5. Your Excellency has taken the wisest course in leaving the question of the reduction of the numbers in the relief camps to the discretion of the Government of Madras, and I have no doubt that the measures suggested in the resolution of the Government of Bombay, a copy of which has been transmitted to Madras, will receive the careful consideration of the Government of the latter Presidency.

6. I fully approve of the instructions issued to the Government of Madras for the publication, in the Government Gazette, of such information as may be procurable as to the details of stocks and of consumption at the various inland markets in the famine districts, and also for the publication of the weekly relief reports. Such information will be of the greatest value in guiding merchants in their conduct of the operations of trade.

7. I need hardly assure your Excellency in Council of the deep interest and sympathy with which I regard the exertions of your Government, and of the Governments of Madras and Bombay, to mitigate, as far as human foresight, judgment, and resolution can mitigate, the terrible and, it may be, increasing evils of the calamity before you.

I have, &c.

(Signed) SALISBURY.

No. 230.

Telegram, dated 14th September 1877.

From Viceroy to Secretary of State.

12th September. Chief Commissioner, Mysore, issued Gazette Extraordinary containing Government orders on Mysore famine affairs as settled after conference with Chief Commissioner and inquiry on spot. Out of 260,000 relief recipients it is doubtful

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if a single man of the nominal one tenth of the whole number hitherto supposed to be on properly arranged relief works is a *bonâ fide* relief labourer; about one twelfth are on Civil Agency works. Persons relieved gratuitously are under no sufficient order or control. Public Works Department in Mysore have persisted against orders in confining all the works at its disposal to able-bodied coolies employed under contract system, and in repudiating its duties on behalf of famine relief; orders are that system of large useful works be framed for employment, under ample safeguards, of all relief recipients capable of any work; public works budget programme to yield to pressing need just as in war. Undertakings not suitable for relief work must be suspended; as sufficient irrigation works not available in Bangalore district, earthworks of Mysore railway sanctioned as relief measure. Gratuitous relief to be temporary and subsidiary to works; as people able to labour are drafted to works, relief camps must be brought into order, inmates registered, disciplined, and kept indoors. One system and scale of food for all camps; volunteer committee managing Bangalore relief, 50,000 persons at Government expense, thanked, and business transferred to Government agency. Village relief not now given. If hereafter granted, to be restricted and not to be in cash.

Mr. C. A. Eliot appointed Famine Commissioner, to assist the Chief Commissioner and direct famine operations; he will inspect famine districts and give orders on spot. Mr. Wingate, a skilled Bombay famine officer, appointed temporary Famine Secretary to Chief Commissioner. Major Moncrieff, in whom I have much confidence, acts as Chief Engineer for Colonel Sankey, temporarily transferred to Simla. Additional engineering and medical staff being arranged for, also young military officers for relief supervision.

Encl. in No. 288.

No. 231.

Dated 14th September 1877.

From Doctors T. R. Lewis and D. D. Cunningham, Special Assistants to the Sanitary Commissioner with the Government of India, to Dr. S. C. Townsend, Officiating Sanitary Commissioner with the Government of India.

We have the honour to acknowledge the receipt of the "extract" from paragraph 4 of a despatch from the Secretary of State to the Government of India, No. 53 (Revenue) dated 26th July 1877, intimating that the further report promised in a communication by one of ourselves to your office regarding the fever then prevalent in Bombay* would be awaited.

* Report by Dr. T. R. Lewis, dated Calcutta, 16th May 1877.

2. The proposal to submit this further report was in great measure made on the supposition that the statements then current regarding the wide distribution of a like fever in Madras were correct. Personal inquiry, however, made it evident that fevers, so far from being exceptionally severe, were decidedly in abeyance.† No opportunity was therefore afforded for instituting the suggested comparisons.

† Report by Dr. D. D. Cunningham, dated Calcutta, 18th June 1877.

3. We have however availed ourselves of the opportunities which the various hospitals and jails of Calcutta afford of carefully observing the forms of fever which have prevailed during this season, but as yet have not observed any which could be regarded as fairly comparable with those which were prevalent in Bombay during the earlier part of the year—the fevers here being for the most part manifestly "intermittents" and "continued."

4. Since our reports were written Surgeon-General Hunter, of Bombay," has submitted to the Local Government an exhaustive account of the leading features of the fever recently prevalent in that city, accompanied by numerous charts of temperature. This report corroborates the inferences which were made in the communication regarding this fever referred to in the despatch, viz., that—(*a*) in none of the cases in which the blood-spirillum had been observed "could the origin of the fever have been directly attributed "to want;" and that (*b*) the clinical history of the fever presented "no well-marked feature "which would be sufficient to distinguish it from the class of fevers usually referred to as "remittents" in this country. German authorities also state that the fever in which the blood-spirillum was originally found "manifested a distinctly remittent character."‡

5. With regard to the first cited of these conclusions we beg to draw special attention to the circumstances that it is in complete accordance with the experience hitherto acquired in connexion with the presence of spirilla in the blood. None of the observers who detected these organisms in Europe have in the remotest manner implied that their

‡ Geissler in Schmidt's Jahrbücher, 1875.

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presence in the blood was associated with want; on the contrary, Geissler expressly states that the fever in which they occur (commonly referred to in Germany as recurrent typhus) is not a famine fever. Indeed it so happened that at the time of one of the epidemics the wages of the labouring classes were exceptionally high.*

No. 232.

Telegram, dated 16th September 1877.

From Viceroy to Secretary of State.

Season telegram, 4th to 14th. Madras, all districts save Coimbatore, Madura, Tinnevelly, good rain, averaging over 2 inches; much improvement to growing crops, pasture, and general prospects. Small harvests reaped, averaging nearly half ordinary yield. Prospects worse in Madura, Coimbatore, Salem, where all depends on October rains. Prices stationary and very dear.

On works, 773,094; on gratuitous, 1,513,555; grain importations by sea maintained at 3,600 tons daily; railway despatches by Raichore short.

Bombay improvement continues; favourable rain everywhere, save part of Poona, Nassik, and Ahmednagar. Autumn crops revived, and mostly saved; winter crops progressing; prices very dear; severe distress continues among poor.

On works, 280,727; on gratuitous, 158,733.

Mysore, showery weather everywhere, much good to crops; autumn millet lost in parts; distress very severe. On works, 52,000; on gratuitous, 227,000.

Hyderabad—heavy rain in Hyderabad, and worst district gauging seven inches; very great benefit. Berar prospects good.

Central India, good rain in Bundelkund; Malwa prospects fair.

No rain in Gwalior, whence migration southwards. General rain of previous week not continued. Rajputana, rain much needed in Ajmere and Eastern States, some showers; less cause for anxiety elsewhere. North-west, good rain in Fyzabad, Shahjehanpore, Humeerpore; elsewhere only partial showers. Prices rising; prospects bad; much autumn crop lost.

Punjaub, general but not sufficient rain, except in Multan, where floods. Unirrigated autumn crop failed generally; ploughing for spring crop proceeding; prices rising. Bengal, Burmah, Central Provinces, Assam, prospects favourable on whole.

No. 233.

Telegram, dated Ootacamund, 16th September 1877.

From Viceroy to the Secretary of State.

Yours 7th. Altered prospects season render unnecessary 20 additional locomotives proposed for Madras Railway in my message of 5th. Please do not confirm arrangement begun thereon.

No. 234. Encl. in No. 239.

No. 846 (Famine).

From the Additional Secretary to the Government of India, Department of Revenue, Agriculture, and Commerce, to the Additional Secretary to the Government of Madras, Revenue Department.

Governor-General's Camp, Ootacamund, dated the 16th September 1877.

A deputation of Wynaad planters waited upon the Viceroy yesterday and represented, among other things, that relief works were greatly needed in both Wynaads for the employment of the immigrant poor from Mysore. They said that tens of thousands of people, over and above the requirements of the coffee estates, had come and were coming into the Wynaad; and they feared that many of these poor immigrants must

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* "*Der Recurrens-typhus ist Kein Hunger-typhus Gerade die Tagelohnarbeiten waren damals gut bezahlt.*" Geissler, op-cit.

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die and were dying before they could be deported back to Mysore and relieved there. The planters represented that, if relief road-work was opened, these people could earn wages; they offered to supervise the work and to arrange for the supply of grain.

2. The Viceroy and Governor-General, in his reply, expressed the opinion of the Government of India that relief works for the employment of the immigrant Mysore poor were required in Coorg and the Wynaad; and he intimated the willingness of the Government of India to defray a part of the cost of such relief works, provided the Madras Government could also contribute and the local planters would bear a share of the cost. It appeared that about 80 miles of district roads had been made, and that the object now was to lay gravel on as much as possible of this length. Metal was, it was said, easily obtainable; its collection, breaking, and stacking would form good relief labour.

3. It appears to his Excellency the Viceroy that the settlement of all details as to the manner and kind of relief work is entirely within the discretion of the Local Government. He understands from his Grace the Governor that the Madras Government is ready to sanction relief works in the Wynaad for Mysore immigrants, provided a part of the cost is contributed by the Government of India from the Mysore revenues or from elsewhere. Accordingly the Viceroy is pleased to direct that a grant of Rs. 30,000 be made by the Government of India to the Madras Government towards relief roads in the Wynaad, provided that at least a corresponding sum is contributed from Madras local and provincial resources; provided that the planters contribute a further sum in money or supervision or labour, or in all three, as the Local Government may decide; and provided that the whole sum now to be available for relief roads is expended between this time and the month of May 1878. The Government of Madras will take such steps as may seem fit for opening the relief roads and relieving the pressure on Mysore as soon as possible.

Encl. in No. 239.

No. 235.

MEMORANDUM by MR. C. A. ELLIOTT ON PROGRESS made from the 10th to the 19th September 1877.

Bangalore, 19th September 1877.

It was decided first of all to take in hand the worst and largest of the Bangalore kitchens—those at the Siledar Lines and the Petta. The former, which is an enclosed place, was first weeded of its able-bodied residents, and their places were filled by drafts of the worst cases relieved at the Petta kitchen. The able-bodied paupers were all put on the railway works close by. At first some difficulties were experienced owing to the great numbers which had to be dealt with and their want of discipline, the unpreparedness of the Public Works Department officers to receive such large additions, and the want of tools and overseers and establishment. By great labour and patience on the part of Mr. Wingate and Major Cole, to whom this duty was specially entrusted, these difficulties were successfully overcome, and we now have about 5,000 labourers on this work, all doing fair work, and brought into good order and system, paid in cash and able to house and feed themselves; and our kitchens are relieved to a more than corresponding extent of the crowds which thronged to them. A special officer has also been put in charge of the Binnamangala camp, and the conditions of residence and labour have been enforced there, and 1,000 people have been sent to work, and are paid in cash and struck off the kitchen rolls. One kitchen (that at Shúle) has been abolished. The following table shows how the Bangalore numbers stood on the 10th and the 19th September:—

	10th September.	19th September.
Petta	11,615	5,548
Siledar Lines	2,675	2,747
Shúle	1,709	—
Cleveland Town	4,159	2,247
Binnamangala	10,575	2,759
Total	30,733	13,301

2. The decrease is probably due to three causes—(1) the seasonable rain and the prospect of field employment in weeding, ploughing, &c.; this cause had already begun to operate in the week ending September 8th, and the numbers had fallen from their highest point; (2) the employment of about 6,000 people on public works, and the

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dread of others, who had accepted food without being really in want, that they would be compelled to work; (3) the enforcement (though as yet only partial) of the rule of residence in the camp. A further cause has perhaps operated here, and will certainly operate when the outlying kitchens are taken in hand, viz., the stoppage of peculation under close supervision.

3. Besides the railway, the chief engineer has notified his readiness to receive about 18,000 people on 15 works in different districts, and his separate note attached to this memo. shows that by the 8th October he will have made arrangements for starting three other works, and will be able to employ 24,000 more. The district officers have been informed about the works which are ready to be started, and they are arranging for the transfer of labourers from their relief camps; but no facts are at present known as to what has been done up to date, except in the case of the road from Bangalore to Túmkúr through Nelamangala.

4. The Famine Commissioner has just visited this road and the Nelamangala relief camp and three others in the neighbourhood. The system of transferring the paupers from gratuitous relief in camps to works under the Public Works Department has been started here with such remarkable success that it deserves to be narrated with some particularity. The Nelamangala relief camp professed to have fed 2,653 persons on the 13th, 2,479 on the 14th, and 2,505 on the 15th. On the morning of the 17th he found about 1,700 people assembled to be fed. Of these he picked out 488 as able-bodied and sent them to the overseer in charge of the road. Of the rest he found only about 20 to be too infirm for work (besides about 200 in the hospital and convalescent ward) and he divided 956 into gangs, and apportioned light work to them. Of these more than half (487) were children whose parents sent them to be fed, but did not come themselves. On the morning of the 19th the overseer had all the 488 drafted from the kitchen on his work, besides a few more drafted on the 18th, and 279 more, volunteers from the neighbourhood; and he had many more applicants, but no tools for them. He had treated them kindly, tasked them with due consideration for their strength, and paid them punctually, and in consequence numbers were flocking to his work. The relief camp on the other hand presented a very changed appearance, and its capacious sheds looked all too wide for its shrunk numbers. Of the 956 people retained as fit for light labour, only about 360 remained; the rest had refused to submit to the conditions of residence and work. Possibly some of them will be unable to find subsistence in their homes, and the system of village inspection will be actively worked to prevent any undue distress arising from the stubbornness of the more impoverished. But the great majority of those who have gone home have done so because they could afford it, and because they preferred it to living in the relief camp under the altered conditions.

5. Similar inspections of three other large relief camps in the neighbourhood produced and are producing similar results. It is not too much to say that all of these were organized in such a way as to create the impression that the *raison d'etre* of the place was to provide for all comers one or two meals a day in the manner most agreeable to the applicants and least laborious to the distributors. No practical effort was made to get the people to work or to retain them in the camp, and when these conditions are enforced the numbers will greatly diminish. Large numbers also of Brahmans and other people of good caste have received rations of raw food without being in distress. To all of these employments suitable to their caste can be offered, to the men as overseers and gangsmen, to the women as rice cleaners and grinders, and their gratuitous rations will be stopped.

6. The Famine Commissioner and the chief engineer are satisfied that those officers were mistaken who believed that the kitchen paupers would refuse to go to public works or would not do a fair day's work on them. On the contrary they believe that the opening of these works will be a real blessing to the famine-stricken population, and that when once they are convinced that the work is lasting and is fairly paid for they will flock to them in large numbers, leaving the relief camps almost empty.

7. During the 10 days since September 10th some important orders have been issued which may be recapitulated here. A circular has been issued prescribing a uniform ration of cooked food for all occupants of relief camps, as well as rates of pay for labourers on public and on civil relief works, accompanied with a sliding scale so as to provide for each labourer's receiving 1½ lbs. of food, with a small sum for condiments—nine pies per man on works where the heavier task is performed, and three pies where the lighter. Instructions have been issued (after consultation with the district officers) for closing nine relief kitchens in the Bangalore District, two in Kolar, and 19 in the two districts of the Ashtagram Division; those kitchens being chosen which are not at

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Taluk headquarters, and which are near enough to other relief camps for the sick and infirm to be transported. A plan has been sketched out for a house-to-house visitation of Bangalore itself, and for the provision of employment for needy artizans by supplying them with materials for their own profession. Orders have been issued to wind up the small civil relief works, finishing off at once those which it would be unwise to leave incomplete and stopping the rest, and to make preparation for starting other and larger civil relief works—the minimum being fixed at 300 people for one month, to supplement where necessary the works undertaken by the Public Works Department; but these are only to be used as safety-valves for labour in cases of emergency. A code is also being prepared for distribution to district and relief officers, laying down the main rules which it is conceived will be found necessary for the establishment of a sound and uniform system.

Encl. in No. 239.

No. 236.

NOTE BY MAJOR C. S. MONCRIEFF, R.E., Chief Engineer.

19th September 1877.

It is rather soon to report any very marked results from the change made last week in the Public Works Administration of Mysore, but the following measures have been taken which it is hoped will soon begin to bear fruit.

2. The first thing was to issue orders that famine relief was to be the main duty of the Public Works Department, that all budget assignments for works in progress were cancelled, and that whether any particular work was to go on or not was to depend on whether or not it was fitted for famine relief. The limit was fixed that each single work should give employment to at least 1,000 unskilled labourers for at least three months. The system of petty contracts was ordered to cease, so that no labourer should get more than a subsistence however strong, nor less than a subsistence however weak, a task at the same time being required from each. Superintending engineers were directed to send in at once list of works that might be taken up for relief, and to consider where new works could be begun.

3. Earnest efforts have been made to empty the kitchens of Bangalore and to transfer the inmates to the new railway. Contiguous to this work is the site of the proposed Agrahara tank embankment. These have both been laid out, and day after day an increased number of labourers are employed. To-morrow there will be about 5,000 on these works, and a week hence there should be as many more.

4. In the Bangalore district arrangements are making for beginning work at once on the Hoskote and Bhadram tanks, where 2,000 might be employed in a week and 4,000 a few days after. Work has begun on the repairs of the road to Túmkúr, and 800 labourers will find work there for the next three months. In a few days 1,000 labourers will be employed on the repairs of the Mysore road. On the Bangalore-Bellary and Yelhanka-Ballapur roads 2,000 labourers will find employment.

5. In Kolar arrangements are being made to receive at once 4,200 people on four tanks.

6. In the Túmkúr District work has begun on the Shimoga road, and 1,400 labourers will be employed for three months. On the Bellary road work will be started in a few days for 1,000 labourers.

7. In the Chitaldroog District the Public Works Officers have been ordered to take over a large tank work at Timmanhilla, lately started by the civil officers. No exact details have been received about this yet, but it is believed that about 3,000 can be employed on it.

8. In the Kadur District, an irrigation channel is being laid out at Keresanté, and the Executive Engineer will be prepared to take on 1,000 labourers by 1st October and 2,000 more a few days after. By the same date work will be ready in that neighbourhood for 1,000 labourers on a new road. Later on their numbers will be increased.

9. In a fortnight work can be given on the Mandigere Channels in the Hassan District, and there too the numbers may be increased in a few days, while the Annaiyanakatte tank works in the same taluk will be put in hand whenever required.

10. On the Mysore waterworks about 2,000 labourers have been employed up to now. The Executive Engineer has orders to convert this into a relief work, and to prepare for 3,000. The Ane Irrigation Channel near Maddur will be started at once with 1,000 labourers, and more can be received, if required.

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11. To sum up, relief works have been begun and will expand, day by day, until by the beginning of October there should be 32,400 employed as below :—

In Bangalore District	- - - -	15,800
„ Kolar „	- - - -	4,200
„ Túmkúr „	- - - -	2,400
„ Chitaldroog „	- - - -	3,000
„ Kadur „	- - - -	2,000
„ Hassan „	- - - -	1,000
„ Mysore „	- - - -	4,000
	Total -	32,400

Should the demand arise this number can be increased a week later to 42,000. Nor is the list exhausted. The postal service in Mysore is not very rapid, and reports are coming in daily from executive engineers of new works suitable for poor relief.

12. In the western districts, Shimoga, Hassan, and Kadur, abundant work can be found on the Malnád roads, but the country is said to be so feverish just now that it would not be judicious to send weakly gangs there until the close of the N.E. monsoon, *i.e.*, the 1st November. Nor is the distress very severe in those tracts.

13. The Túmkúr District is suffering severely, and the Public Works Department can as yet suggest no large work to employ the people. Search is being made for suitable tank sites; should that fail it may be necessary to move the population to the banks of the Cauvery in the Mysore District, where most useful irrigation channels can at once be put in hand, extensive enough to employ from 10 to 15,000 people.

14. The heavy rain of the last fortnight will now greatly reduce the number of poor in the kitchens. But in case further labour should still be required, the Mysore railway can be started for 12 miles beyond Bangalore, giving a large field for labour.

No. 237.

Encl. in No. 289.

No. 856, dated Bangalore, 20th September 1877.

From the Additional Secretary to the Government of India to the Additional Secretary to the Government of Madras.

I am directed to acknowledge the receipt of your letter, No. 2619, dated 31st August, forwarding a statement in which the Revenue Board show approximately the demand, collections, remissions, and balances of land revenue of the year 1876–77 as compared with the three previous years.

2. The Viceroy and Governor-General gathers from this statement the following main facts :—

	Lakhs.
(*a.*) The land revenue current demand for the year 1876–77 was only - - - - - - - -	355
Compared with an average current demand of the three previous years of - - - - - - -	449
(*b.*) The total collections current and arrears for the year 1876–77 was only - - - - - - - -	278
Compared with a previous average of - - -	449
(*c.*) The actual remissions of the year 1876–77 are only - - on account of the arrear demand, no remissions having yet been granted on the current demand.	3
(*d.*) The balances of the year 1876–77 are - - - -	130
Compared with a previous average of - - -	60

3. It thus appears that the deficiency in the year's* land revenue collections amount to 449 minus 278 lakhs, that is to 171 lakhs. This total is considerably in excess of previous estimates. If more than 45 lakhs out of the outstanding balance of 130 lakhs should be collected hereafter, then the deficiency on the year will be proportionately reduced. But if the arrear collections of the present year fall short of 45 lakhs, then the deficiency of the year 1876–77 will practically be increased above the total of 171 lakhs.

* July 1876 to June 1877, inclusive.

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4. The partial failure of the south-west monsoon of 1877 has made the collection of arrears more difficult, and may in some cases necessitate a reduction of the current year's demand below the average of previous years. His Excellency the Viceroy has confidence that the Government of Madras will not permit sacrifice of revenue, either by reduction of the demand or by remissions, beyond what is absolutely necessary. But he desires to invite the attention of his Grace the Governor in Council to the extreme gravity of the losses which the public treasury has, according to these papers, to bear.

No. 238.

Revenue No. 65.

From the SECRETARY OF STATE FOR INDIA to the GOVERNOR-GENERAL OF INDIA IN COUNCIL.

India Office, London, 20th September 1877.

No. 103. Para. 1. The despatch of your Excellency in Council, dated 30th July, No. 31 of 1877, on the subject of the famine in the Presidencies of Madras and Bombay, the territory of His Highness the Nizam, and the province of Mysore, has been considered by me in Council.

2. The Despatch gives a very clear statement of the situation throughout India on the date on which it was written. It also submits some useful information both as to the probable requirements of the famine districts of Madras, Bombay, and Mysore, and as to the stocks of grain in other parts available for exportation.

3. I fully approve of the intimation which your Excellency in Council has made by telegraph to the Governor of the Straits Settlements as to the importance of encouraging importation of rice into India, and, through the Straits Government, to the Governor General of Cochin China, and the King of Siam, on the same subject.

4. I shall await with interest a detailed account of the arrangements which your Excellency in Council has under consideration for securing a more united action between the several railway companies for the facilitation of the transport of grain.

I have, &c.
(Signed) SALISBURY.

No. 239.

No. 35 of 1877.

From the GOVERNOR-GENERAL OF INDIA, Department of Revenue, Agriculture, and Commerce, Famine, to the SECRETARY OF STATE FOR INDIA.

Bangalore, the 20th September 1877.

In my last letter, dated 5th September, I informed your Lordship that it was my intention to proceed to Bangalore for the purpose of taking, in communication with the Chief Commissioner, such steps as might then, after adequate inquiry, appear to me necessary to improve the Famine Administration of the Mysore Province.

2. From my minute of 12th August, and from our regular despatches, it will have become known to your Lordship that the state of affairs in this province has long been a source of grave anxiety to the Government of India; and I had, in anticipation of my visit, despatched from Poona two selected officers, Mr. C. A. Elliott and Major Scott Moncrieff, to study the actual condition of the famine administration in Mysore, with a view to the eventual employment of these officers, under the Chief Commissioner, in the introduction of an improved system.

3. I regret to inform your Lordship that from the statement laid before me by these gentlemen, and from the communications I have now held with the chief civil officers of the province, as also from what I myself saw at Bangalore, I was forced to the conclusion that matters were even worse than I had anticipated; that the provision of proper relief works had been entirely neglected; that gratuitous relief, which had increased to an inordinate extent, had been administered in a lax and unsystematic manner; that crime had greatly increased; that people were wandering from Mysore into other districts in vast numbers; and that the mortality both in hospitals and among the wanderers was terrible.

4. The annexed statement will show your Lordship how the numbers relieved, respectively on works and under the system of gratuitous relief, have varied during the

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past six months; and how utterly disproportionate is the former to the latter class. But even this statement does not adequately represent the whole evil. I found while at Bangalore that the people employed on works under the organization of the Department of Public Works were not, properly speaking, relief labourers at all. The works were not special relief works, but were those sanctioned in the ordinary way under the annual budget allotment; and the labourers employed on them were the ordinary able-bodied coolies, paid by piece work, and engaged by the ordinary petty contractors of the Department. That these works kept a number of the labourers so employed from the necessity of applying for relief cannot be doubted, but in no other sense can they be called relief works, and the system under which they were employed had been already emphatically condemned by the Government of India in its communications with the Chief Commissioner of Mysore.

	On Works under D. P. W.	On Works under Civil Agency.	Gratuitously relieved.	Total.
March - - - -	31,081	41,735	43,592	1,16,408
April - - - -	31,495	29,740	74,569	1,35,804
May - - - -	32,499	30,011	1,03,392	1,65,902
June - - - -	26,807	28,066	1,14,109	1,68,982
July - - - -	20,777	26,325	1,44,861	1,91,963
August - - - -	22,644	25,981	1,99,375	2,48,000

5. I was anxious to introduce an improved system of management without any undue interference with the ordinary administration of the country, and I found that the Chief Commissioner was fully prepared to accept and carry out my views. Mr. Saunders had, in fact, previously issued instructions in accordance with the general policy of the Government of India; and these instructions, had they been obeyed, would probably have ensured the timely introduction of a proper system of relief works in Mysore.

6. His chief engineer, however, had objected to the employment of the Public Works establishment otherwise than on the ordinary contract system, and had omitted to provide any special works for relief purposes. Even on the brief extension of the Bangalore Railway, which had already been sanctioned by the Government of India, the Department had declined to employ more than 300 out of the thousands who were ready to labour, and whom the civil officers were anxious to draft from gratuitous relief to works.

7. Colonel Sankey, the chief engineer, is an officer of much experience in Mysore, and has the reputation of being a very able engineer. He has under him an unusually strong departmental staff in proportion to the size of the Province; and I had hoped that he would prove a valuable assistant in carrying out my policy of making large relief works, under departmental supervision, the backbone of the whole relief system. I accordingly explained my views to him at some length, first in a private interview, and afterwards at the conference which I held with the Chief Commissioner and other officers.

8. To my regret Colonel Sankey persisted in objecting to the employment of his departmental organization for the supervision of real relief works; he brought forward a scheme of works which were, he said, ready to be put in hand; but these, when examined, proved insufficient to give employment to more than one half the requisite number; and even for this instalment, Colonel Sankey repeated his unwillingness to employ any of his regular staff, or to divert them from the ordinary sanctioned works. Those works opened for relief purposes he proposed to start with only such additional assistance as the Government of India might be able to afford him from other provinces.

9. It thus became clear to me that to entrust Colonel Sankey with the execution of our famine policy was to ensure the failure of it. It will, in any circumstances, be a matter of great difficulty to withdraw people from the loose, undisciplined, idle life of relief kitchens (where they are fed gratuitously, and having got their meal may employ the rest of their time as they think best) to the strictly enforced tasks and regular discipline of properly supervised public works; and I felt that I could not justly, or with due regard to the interests of the public, rely upon the exertions of Colonel Sankey for the successful prosecution of a policy which he seemed unable to accept in principle and unwilling to adopt in practice. I therefore took advantage of a wish expressed by Sir Andrew Clarke for the temporary assistance of a deputy secretary during the pressure caused by famine work in the Central Office of the Department Public Works, and Colonel Sankey has been appointed to this duty. I have transferred Major Scott Mon-

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crieff, R.E., to the temporary chief engineership of the Province, and I am quite satisfied to leave in his hands the execution of the Government policy.

No. 223. 10. The other arrangements which I have made for improving the famine administration of Mysore will be found in the letter (No. 821, of 8th September) from my Additional Secretary to the Chief Commissioner, which forms Enclosure No. 1 to this letter.

11. In addition to the main object of providing sufficient relief works on a proper system for the destitute poor I directed the Chief Commissioner's attention to the necessity of re-organising his relief kitchens, and maintaining them as enclosed camps under proper discipline and control. I ordered that those in Bangalore which are supported from Government funds, and which had quite out-grown the supervision of the volunteer committee by whom they had hitherto been administered, should now be placed under the responsible control of Government officers, and to assist the Chief Commissioner in carrying out these instructions I placed at his disposal the services of Mr. C. A. Elliott as Famine Commissioner, and of Mr. Wingate, of the Bombay Service, as Additional Secretary. Both these officers have been carefully selected on account of their special qualifications. In the lower grades I have strengthened the hands of the Chief Commissioner by appointing five military officers to assist in relief works, and by obtaining for him the services of the additional medical engineering staff entered on the margin.

34 medical subordinates in addition to the 14 previously sent.
2 executive engineers.
7 assistant engineers.
6 subordinates.

12. I have determined, after consulting Mr. Molesworth, as well as the most experienced local officers, to sanction the commencement of the earthwork of the Bangalore and Mysore Railway as a famine work. It is specially suitable for this purpose from its situation, the line of country through which it passes, and the facilities it affords for supervision. When considering the scheme for Mysore relief works I bore in mind the despatches regarding the Mysore Railway, which conveyed your Lordship's instructions that the Mysore savings should be spent on irrigation works rather than on the railway; and I only sanctioned the railway earthwork, when it had become quite clear to me that sufficient irrigation works were not ready in and near the Bangalore District, where 90,000 people are receiving relief. In estimating the necessity and probable effect of this measure it may be well to remember the character of the irrigation works in Central and Northern Mysore; they are all rain-fed tanks, and their waters fail in a season of drought, so that the Mysore Railway is perhaps a more effective work of famine protection than the ordinary irrigation works of the country. The railway work will be begun in two principal sections, the length which will be put in hand in the first instance being 46 miles, 36 miles at the Bangalore end of the line, and 10 at the Mysore end. The intervening space will be put in hand, if necessary, as soon as some questions concerning its alignment have been re-considered.

13. I explained in my letter No. 33 of 5th September to your Lordship (para. 29) the circumstances under which the Government of India had consented to sanction a loan to the Mysore Government of 50 lakhs of rupees. Finding on my arrival at Bangalore that the Chief Commissioner was much pressed for funds, and that the balance of his invested surplus (9 lakhs) could only be sold out, at the present moment, at a sacrifice of from 8 to 10 per cent. discount, I sanctioned his drawing at once on the Madras treasury (which I had ascertained to be amply supplied) for a first instalment of 10 lakhs on account of the loan, postponing the sale of his invested surplus till a more favourable opportunity.

14. I could wish that the Mysore administration had been able to show some useful works for the many lakhs which have already gone in famine relief; but, as it is, I doubt not that but for this expenditure the loss of life, severe though it be, would have been indefinitely multiplied. I trust that the arrangements I have now made will be instrumental not only in saving many lives, but also in giving to the Mysore State some useful return for the vast sums which must still inevitably be expended by it in order to preserve the social and material sources of its future agricultural prosperity.

15. Before leaving Bangalore I determined, in consultation with my colleague, Sir A. Arbuthnot, to take into my own hands the administration of the Famine Department of the Government of India. This arrangement was proposed to me by Sir A. Arbuthnot as the natural corollary of the changes, which the Duke of Buckingham had adopted in the Madras administration; but the proposal commended itself for various reasons to my judgment. The paramount importance of famine administration at the present time has obliged me in practice to give to the details of it the closest and most constant personal supervision; it therefore seemed desirable on public grounds that I should openly and definitely acknowledge the responsibility I have virtually undertaken for the

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success or failure of the policy I have laid down, and am endeavouring to enforce, in the conduct of relief operations. The arrangement tends also to a speedier disposal of business, and diminishes the frequeney of references.

16. Sir A. Arbuthnot on receiving my assent to the above-mentioned proposal, returned, at his own request, to Simla, where his presence was much needed in consequence of the illness of Sir J. Strachey, who had during Sir Alexander's absence taken charge of the Department of Revenue, Agriculture, and Commerce.

17. I left Bangalore on the evening of Sunday the 9th instant, and halted the following morning for a few hours at Coimbatore where, in company with the Collector, Mr. Wedderburn, I inspected the relief camps, work, and hospital. The condition of these institutions does not differ materially from those I had inspected at Bellary and Madras. There was a large proportion of people gratuitously maintained who were perfectly competent to labour, but for whom no work was found; the scale of diet was high, and for some classes unnecessarily luxurious. The rainfall of the district is always small (10 to 12 inches), and this year is no exception to the rule. The state of the crops, however, near the town of Coimbatore was fair, as irrigation was available, but in the interior of the district the early autumn crops have failed.

18. I continued my journey the same day to Coonoor, a European settlement on the edge of the Neilgherry hills; and on the 11th I proceeded to Ootacamund. At each of these places I was waited on by deputations who urged the wants of their respective municipalities, and both of them laid special stress on the necessity of a railway, on the Rigi mountain principle, to the Hills; for which a guarantee of 4 per cent. on the outlay was demanded. I informed the above-mentioned deputations that whenever the Madras Government are prepared to forward to the Supreme Government a practical scheme for the construction of such a railroad, it will receive my earnest consideration, but that in the meantime I was unable to give any definite expression to the view which might ultimately be taken of it by the Government of India. I received at Ootacamund a deputation from the coffee planters of the Wynad, whose address dealt with various subjects now under the consideration of the Madras Government, but who also made some special requests, which I may properly bring to your Lordship's notice. The most pressing of these was in regard to wanderers from Mysore seeking employment in the Wynad. The coffee estates in the Wynad habitually give employment to large numbers of labourers from Mysore; but this year in consequence of the famine the numbers thus seeking employment are infinitely in excess of the labour requirements of the estates. Numbers of these wanderers, too, arrive in a weak and emaciated condition which renders them utterly unfit for labour. Many of these, as soon as they are fit to travel, are deported back to Mysore by the Madras Government; but several of them, it is feared, die, and others linger on, fed either by private charity or in relief houses. The Planters' Association urged the expediency of starting relief works for these people in the shape of preparing and collecting metal for 80 miles of road, already made, and they offer to contribute in money and supervision. After personally consulting his Grace the Duke of Buckingham I came to the conclusion that their request was a reasonable one; and I determined to grant a sum of Rs. 30,000, to be recovered ultimately from the Mysore State, as a contribution to the estimated expenditure, on condition that the Madras Government and the Planters' Association provided the rest. I have left the details in the hands of the Madras Government, and my Secretary's communication (No. 846, dated the 16th instant) to that Government forms Enclosure No. 2 to this letter. No. 234.

19. The other requests submitted to me by the Wynad planters were for the unifaction of the coffee districts under one administrative head, and for the simplification of extradition between Mysore and British territory. The first question involves the transfer to the Madras Government of the Coorg District which is now administered by the Chief Commissioner of Mysore, and it cannot, therefore, be settled till it has been discussed with both authorities. The latter is a simpler matter; and, as there is no reason whatever why Mysore, while it is under British administration, should not be treated in respect to the service of the processes of our courts precisely as if it were British territory, I propose to communicate my wishes on this subject to the Chief Commissioner without delay.

20. I left Ootacamund early on the morning of the 16th September and reached Mysore late in the evening of the 17th, after inspecting some large cinchona and coffee plantations on my way thither. A considerable portion of the Madras territory through which I then passed is largely auriferous, and I was informed by an experienced expert, who has for two years been investigating its mineral resources, that neither in California nor in Australia, all parts of which he had previously visited, do there exist gold deposits

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more capable of being remuneratively worked. This statement appears to me an important one, and I may perhaps take an early occasion of addressing to your Lordship a special communication on the subject of it. Meanwhile I may mention that silver is also found, as well as considerable quantities of small diamonds, in the Wynad.

21. The political incidents of my visit to Mysore will be recorded in a separate letter, but in this I desire to report what I learnt of the condition of Coorg in relation to the famine-stricken immigrants from Mysore.

22. The coffee planters of Coorg, like those of the Wynad, are mainly dependent on Mysore for their labour supply, and, as in the Wynad, multitudes of immigrants unable to find work, or unfit to work, are to be found in Coorg in a state of extreme destitution, and the mortality among them has been very grievous indeed. A memorial purporting to come from the Planters' Association at Coorg was submitted to my Private Secretary for presentation to me, but, as it was not presented through the local authorities, and in fact had been refused by them, I declined to accept it formally as a memorial, but expressed my willingness to receive the two gentlemen who had come as a deputation to present it, and to hear all they had to urge.

23. These two* gentlemen accordingly waited on me on the 18th, the Chief Commissioner of Mysore and the Superintendent of Coorg being present at the interview.

* Rev. A. Fennel. Mr. Hunt.

They dwelt specially in the conversation that ensued on the great mortality among the wanderers from Mysore, a mortality which had they asserted been greatly underestimated by the local authorities; they complained that no relief works had been established, and said that the planters were through poverty unable to support the starving wanderers. Many of their assertions were traversed by the local officers, but it was clear that, as a matter of fact, relief works had not been established in Coorg, and that there was urgent necessity for them. I learnt that while roads were numerous in the province a considerable portion of them require to be metalled, and that one or two good roads, the need of which is admitted, still remain to be made. Finally I offered to grant either from Mysore or from imperial revenues a sum of Rs. 50,000 if the planters would consent to contribute one third of that amount either in money or supervision. Finding however that the two gentlemen forming the deputation had no authority to accept such an offer, and that they did not actually represent the whole body of planters, I undertook to depute either the Famine Commissioner, Mr. Elliott, or Major Scott Moncrieff to visit Mercara, and to ascertain personally what the actual wishes of the planters are, and what may best be done with their co-operation in the way of starting relief works.

24. I am greatly pleased to be able to inform your Lordship that, on returning to Bangalore (which I reached last night), I found most satisfactory evidence of the beneficial results of the system of relief operations, which I had established before leaving this town on the 9th current. These results are recorded in a most interesting memorandum
Nos. 235–6. by Mr. Elliott, which forms Enclosure No. 3 to the present letter. Your Lordship will perceive from this very suggestive paper that uniform rates of wage on relief works and rates of food ration in relief camps have been laid down; that orders have issued for closing superfluous and unsupervised relief kitchens, the really necessitous recipients of relief being brought into well supervised relief camps; that petty relief works under civil officers are being wound up and closed; that in and around Bangalore town one relief kitchen has been closed, while from the other kitchens persons capable of labour are being drafted to relief works, that already 5,000 have been so drafted and are doing good work on the railway bank instead of being fed in idleness at the kitchens; that the relief recipients who cannot labour are being kept inside the camps and tended until they recover, in-door being thus substituted for out-door gratuitous relief; that relief employment of a kind suitable to destitute artizans and higher caste people is being arranged in Bangalore town, and that partly in consequence of these measures, and partly in consequence of the favourable change in the season the number of inmates in the Bangalore kitchens has fallen from 30,733 to 13,301. Great care is taken by the officers in charge to treat specially persons who come on the works in an enfeebled state of body.

25. On the 16th I despatched to your Lordship a telegram reporting on the state and prospects of the season. On the 22nd I shall send from Poona a further telegraphic report. I am glad to say that over the whole of Southern India prospects have continued to improve; rain has fallen everywhere except in parts of the Madura District and a small tract round Poona. The numbers receiving relief in the Madras Districts have begun to decrease by reason of people going away to their fields, but it is not yet certain that the reduction in numbers will be permanent. Prices are somewhat cheaper both in Bombay and Madras; but prices in the interior have fallen but little

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and are still very dear; and the pressure on the poorer classes is still very severe. Even under the most favourable circumstances the pressure cannot greatly abate until the middle of November, by which time the prospects of the great winter food crops will be ascertained. The condition of the North-West Provinces and Oudh is still very critical, no sufficient rain has fallen in the Agra, Rohilkund, or Meerut Division, or over a great part of Oudh. And there is still cause for much anxiety about the States of Gwalior, Meywar, and of North-eastern Rajputana. The chiefships of Kattywar and the Baroda country are happily out of danger for the present.

I have, &c.
(Signed) LYTTON.

No. 240. Encl. in No. 253.

No. 2,810, dated Fort St. George, the 20th September 1877.

From J. H. GARSTIN, Esq., Additional Secretary to Government of Madras, Revenue Department, to S. C. BAYLEY, Esq., C.S.I., Additional Secretary to the Government of India.

In continuation of my letter of the 3rd September 1877, No. 2,630-B., I am directed to forward, for the information of his Excellency the Governor-General in Council, the accompanying copies of a letter from the Secretary to the General Committee of the Madras Famine Relief Fund, and its enclosures, setting forth the objects on which, and the agency through which, it is proposed to expend the funds raised by public subscription in aid of sufferers by the present famine. No. 210.

2. It will be seen from page 4 of Enclosure A. to Mr. Digby's letter that the General Committee propose to expend the money placed at their disposal in the following manner:—

(1.) In aiding by contributions local committees for the relief of the necessitous poor not reached by Government.
(2.) In giving contributions towards the taking care of destitute children and the like.
(3.) In providing clothes for destitute women and children.
(4.) In making allotments towards any special object which seem to come within the scope and ability of the fund.
And as further information is received, the Committee hope the objects on which they propose to spend the money will be more specifically defined.
(5.) The agency on which the Committee largely rely is that of missionaries, but they had apparently hoped that the officers of Government would have greatly assisted them also, and they earnestly beg that they may be allowed to do so.
(6.) On this point I am directed to solicit the early orders of his Excellency the Governor-General in Council.

No. 241. Encl. in No. 253.

EXTRACT from the Proceedings of the Government of Madras, Revenue Department, No. 2,810, dated 20th September 1877.

Read the following paper:—

From W. DIGBY, Esq., Honorary Secretary, General Famine Relief Fund, to J. H. GARSTIN, Esq., Additional Secretary to Government, Revenue Department, Fort St. George.

In reply to your letter of 18th instant, in continuation of office docket No. 2,630 A., dated 3rd September instant, and the reply of the General Famine Relief Committee thereto, I am instructed by the Committee to submit the accompanying papers, marked A.,* which indicates the objects on which the Committee propose the relief funds should be at present expended.

As information which the Committee have taken active steps to procure is received, their operations will be more definitely directed and widely extended; and at the same time will be capable of more distinct definition; attention is particularly drawn to the resolution recorded at page 4 of Enclosure A.

2. The allotments that have already been made in pursuance of the abovesaid objects are stated at page 7 of Enclosure A. The Committee regret that much more has not

* These were not forwarded from India.

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been done, but difficulties over which they had no control have impeded their operations; these will be alluded to farther on.

3. The circulars already issued by the Committee, requesting collectors and other influential officers to aid by forming local committees, have elicited little response. The General Committee have accordingly resolved to send deputations in the persons of the Rev. Dr. Strachan and F. Rowlandson, Esq., to assist present efforts and arrange for further operations. A copy of the instructions given these gentlemen (who are proceeding forthwith to the distressed districts), marked B., herewith enclosed, will explain the Committee's intentions in employing them. It may be observed that missionary agency and co-operation is very largely relied upon.

4. Special difficulties in promptly utilizing the Famine Relief Funds have been alluded to above. These have arisen from the impression produced by what appeared in the public prints with respect to the suspension of public meetings, and by the official correspondence recorded in the "Gazette of India Extraordinary," dated 31st August, and the action that was taken thereon. It is obvious that officials generally have felt themselves debarred from co-operating in the objects of the Committee.

5. I am therefore to express the earnest hope of the Committee that Government will be pleased to inform its officers that it is the desire of Government that public servants of all grades should give all the assistance they can render, without detriment to their official duties, to the formation of local committees, and generally to promote the objects which the Famine Relief Committee, and subscribers to the Famine Relief Fund, have in view. The Committee respectfully suggest that a Gazette announcement to this effect be published forthwith.

B.

INSTRUCTIONS.

To organise, as far as possible, local committees in different parts of the various distressed districts to be in direct communication with the General Relief Committee at Madras for the distribution of Famine Funds.

2. Also to organise special agencies where local committees cannot be formed or sub-agencies are likely to be more efficient.

3. The fund is designed to relieve the necessitous poor whom Government cannot, or do not, reach, and care is necessary to avoid even indirect interference with Government operations.

4. Under the above designation may be included those who are not ordinarily reckoned "poor," but who are rendered dependent by the present distress.

5. While Government operations have for their object the salvation of life, the funds may be legitimately applied to the mitigation of intense suffering.

6. Whatever agency may be employed, proceedings to be reported and accounts rendered by that agency to the General Committee.

7. The General Committee will be prepared to make pecuniary provision, if necessary (within reasonable limits), for preparing local accounts.

8. It is important to impress upon those who are invited to give their services that the object is not to collect funds, but to secure promptitude, economy, and efficiency in dispensing the funds placed at the General Committee's disposal.

9. The deputations to keep the General Committee informed of the local arrangements made.

10. These points are noticed to indicate generally the Committee's wishes, but they leave the deputations a wide discretion and rely on their making the best arrangements which the circumstances in each locality admit of within the scope of the funds, and the general principles above enunciated.

11. The Committee look to the deputations for practical suggestions for the more efficient and prompt distribution of the funds, and the object to which they, as the local committee, desire to apply them.

No. 242.

Telegram, dated Poonah, 22nd September 1877.

From Viceroy to Secretary of State.

Referring to Simla financial telegram of 14th, I have now following figures regarding famine expenditure in Madras:—

Actuals to end of August 409 lacs; estimate for September 60 lacs; October to March 150 lacs; total 619 lacs. Short revenue receipts to end of August 200 lacs;

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estimate of further loss not received. I take additional 80 lacs; total for Madras 900 lacs.

Bombay total estimate 200 lacs. Mysore and Hyderabad expenditure and deficient revenue 100 lacs a-piece. Grand total 11 crores for British India and two crores for feudatories.

Madras estimate will be largely exceeded if north-east monsoon fails, or if further delay occurs in executing orders of 31st August; delay of three weeks allowed by Madras has caused much unnecessary expenditure.

No. 243.

Telegram, dated Poonah, 22nd September 1877.

From Viceroy to Secretary of State.

Before leaving Madras Presidency I had interview with the Duke, and approved draft instructions which he will issue to give effect to policy agreed on between us. Delay, however, has been most detrimental both to population and finances. During past fortnight good rain has everywhere put people in heart and provided work in fields, affording admirable opportunity for weeding relief camps, but three weeks were wasted before issuing instructions. The Duke's orders provide for drafting destitute persons who are capable of labour on to works. Every precaution has been taken to prevent loss of life in effecting this, and to prevent overtasking feeble persons on works. Effect has already been given to similar orders, dated one week later, in Mysore, with admirable results.

Separate telegram on Mysore affairs despatched to-day. Prospects in both Madras and Mysore much improved.

No. 244.

Telegram, dated 22nd September 1877.

From Secretary of State to Governor of Madras.

Following for your information.

A merchant reports Native merchants have arranged for delivery of rice at Tuticorin, Madras, and Negapatam before 15th October or after 30th November to prevent recurrence of loss from rains, thus leaving ports in question without supplies for six weeks. He suggests Government should pay compensation at market value for rice destroyed, upon importers proving that warehouse accommodation is insufficient.

No. 245.

Telegram, dated 22nd September 1877.

From Viceroy, Poona, to Secretary of State.

My letter 20th September gives your Lordship full details of my orders regarding famine administration in Mysore; immediate effect given to those orders, with following results:—

Uniform rates of wage on relief works and uniform scales of rations for relief camps have been laid down; relief kitchens are being closed or converted into organised and disciplined camps. In Bangalore 5,000 persons drafted from gratuitous relief to work on railways; in Bangalore town, numbers in relief kitchens have fallen from 30,000 to 13,000. Neighbouring district Kolar, in three relief kitchens, numbers fallen from 6,500 to 1,450; of these, 1,600 gone to works, rest to fields, because recent rain renders cultivation possible. Great care taken to prevent loss of life in carrying out these steps, feeble persons treated specially; overtasking avoided.

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No. 246.

No. 36 of 1877.

From GOVERNOR-GENERAL, Department of Revenue, Agriculture, and Commerce, Famine, to the SECRETARY OF STATE FOR INDIA.

Governor-General's Camp, Poona,
22nd September 1877.

In paragraph 3 of your Lordship's despatch, No. 62, dated 9th August, is expressed approval of the orders issued by us, enjoining publicity in rare cases, where district officers find it necessary to purchase grain for the supply of any landlocked foodless tract. And the same paragraph counsels vigilance in watching the operation of our orders restricting the purchase of grain.

The words of this paragraph were telegraphed to me by your Lordship on the 10th August and we submitted by telegraph the reply given in the margin. Since the despatch of that telegram my minute, dated the 12th August, has given (paragraph 18) a general statement of the principles which should guide the Government of India when any question arises of importing grain on Government account. That paragraph gives expression to views in which all my colleagues concur; it runs thus:—

Telegram dated 14th August 1877.

Your cypher message of 10th. We do not fully understand the object of it.

Our instructions about publication referred only to local purchases from trade. We decided at outset that private trade would import grain more efficiently than Government, and we have lately re-asserted publicly our determination not to interfere.

Do you intend to say that you think it probable that Government ought to make large importations of grain?

We can foresee no circumstances under which such Government interference with private trade would not be a ruinous mistake. Trade towards famine country from Bengal, Central and Northern India is most active, and we see no reason to doubt that the necessary supplies will be furnished. We are convinced that far more food from abroad or elsewhere will reach Madras if we leave private enterprise to itself, and we should paralyse it by Government competition. Free and abundant private trade cannot co-exist with Government importations. Even if we anticipated failure in source of supply, we should still believe that Government interference would only decrease the total amount of food available and aggravate the catastrophe.

If Her Majesty's Government should think differently, we request that we may receive distinct intimation of the fact. We cannot take upon ourselves any responsibility for a course which would in our opinion be fatal. Nor can we usefully give calculations. Local estimates say that from 4 to 5,000 tons of grain must be imported daily: grain actually ready for export on Great Indian Peninsula Railway reported to be 120,000 tons and stocks in Bengal, Central and Northern India believed to be large.

"18. When harvests fail in an Indian province, considerable old stocks of food are left in the hands of the landholding and mercantile classes; but these stocks are often held back from sale. Markets have, therefore, to be supplied with grain imported from a distance. I consider that, except under most peculiar and exceptional circumstances, the function of supplying the demand for imported grain can be best, and, indeed, alone discharged by private trade, and that private trade should be left to do its work in this respect with as little interference from Government as practicable. The Government and its officers should, however, give all possible information, and should give, where necessary, additional facilities to private trade. Early and correct information as to prices and means of carriage should be published. The carrying power of railways and canals leading into the famine tracts should be reinforced, tolls and other restraints on free intercommunication should be removed; roads into the interior should be improved and kept in order; rates of railway or other carriage might be reduced, and in cases of extreme necessity temporary railways or tramways might be laid from main railway lines into populous tracts whereto means of communication failed, or were insufficient. These will, indeed, be the most useful of all works if we have to meet another year of famine. Grain required by Government for alms to the helpless poor, or for labourers on relief works, or for any tract where supplies were deficient, should be obtained through the trade, at or near the local markets, and should not be imported from a distance by Government itself. Experience has shown that Government operations in the grain market disorganise and paralyse private trade to an extent out of all proportion to the operations themselves. Moreover, where the carrying power of a country by rail, canal, or cart is limited, and is fully utilised, Government grain importations must necessarily displace a corresponding quantity of privately imported grain. My view, therefore, is that under no circumstances which are likely to occur ought the Government itself to engage in the business of importing grain. Free and abundant private trade cannot co-exist with Government importation. Absolute non-interference with the operations of private commercial enterprise must be the foundation of our present famine policy. Trade towards the famine country from Bengal and Northern and Central India is at present active, and there is every reason to believe that the Indian sources of supply are still considerable. But even if these should fail, the interference of the Government would be a ruinous error. It could only have the effect of decreasing the total amount of food available, and thus aggravating the catastrophe. I am confident that more food, whether from abroad or elsewhere, will

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reach Madras if we leave private enterprise to itself, than if we paralyse it by Government competition. These remarks refer to the famine we are now dealing with. I do not, of course, intend to assert that famines cannot occur in which Government interference for the importation of food may not be absolutely necessary. Indeed, the Orissa Famine was one of those cases."

2. In addition to what has been urged in the telegram and extract quoted above I would add a short further explanation of the principles which guide the Government of India, and of the position we take when we decline, under present circumstances, to purchase and import grain for the supply of the famine districts.

3. If prices do not greatly rise after a failure of harvest, and if imports are inactive, then the natural conclusion would be that there must be considerable old stocks in the country. These are of course difficult, if not impossible, to trace. When prices in a province approach famine rates, then we presume that if surplus food exists in other provinces, and if communication by water or railway be fairly good, private traders will carry that food to the famine districts more cheaply, more promptly, and more directly than Government could possibly do. If there is one branch of internal trade which Indian traders fully understand, it is the grain trade; they know what grain is wanted, whence it can be bought most cheaply, and where the need is sorest. Among the many contrasts between the system of Government importations adopted in 1874 and the private trade system of 1877, it may be mentioned that the Government importations in 1874 consisted, with some small exceptions, of rice, mostly of Burmah rice;—while private trade has in 1877 brought under contribution every province and every food staple in India;—wheat, barley, grain, two kinds of millet (jowar and bajra), and pulses have come from scores of railway stations in the Punjab, the North-western Provinces and Behar, from the River Chenab on the north to the Soane on the south; rice, pulses, and marwa millet (the ragi of Madras) have come from Bengal and Orissa; millets and pulses have come from Guzerat, Berar, the Central Provinces, and even from Rajputana. Burmah has sent a small quantity of rice; but Burmah rice generally rules dearer than the common varieties of Bengal rice, and so traders have drawn but little from that source of supply, so long as Bengal stocks were large.

4. Not only could private traders do the work of supplying grain to Southern India better than Government could do it; but it was obvious that the trade, as a whole, could make much larger importations than Government could effect by itself. If once the Government were to begin importing grain, the first rumour of any impending intrusion of Government action into the field of private enterprise would paralyse the confidence of the whole trade, would send up prices at the source of supply, would keep up prices in the famine country below the natural trade level, and would thus, indirectly as well as directly, check imports. The Government having once entered on such an undertaking there would be no half-way stage at which we could arrest our ruinous course. The Government would soon find itself responsible for providing grain enough for every village, not merely in Madras and Mysore, but also in tracts of Northern India to which famine might spread. Any partial substitution of Government agency for private trade was impossible. We had to choose between either leaving private trade alone or taking upon ourselves the whole of its natural work. If we had adopted the latter alternative, it would probably have cost the Government more to lay down one ton of grain than it would have cost the trade to lay down two. We had before us the financial results of the Bengal famine of 1874, where the cost* of buying and transporting Government grain came to 6,474,000*l.* out of a gross expenditure of 9,177,000*l.*, or to 4,259,000*l.* out of a net cost of 6,402,000*l.* The famine of 1877 has been severer, and has extended over a far larger area than the famine of 1874; if we had taken the grain supply into our own hands, the cost of famine relief in 1876–78, alarmingly great as it is, must have been indefinitely increased. If Government had undertaken to import grain for the supply of Southern India, we should, even if we had succeeded in our undertaking—which is doubtful—have made a stride, of which the magnitude can only be conjectured, on the road to national bankruptcy.

* Note.—These figures are taken from the approximate statement of the Bengal famine charges given in Part V. of Sir Richard Temple's final Report, submitted at the close of the Bengal famine of 1874.

5. The financial argument indeed, in the present condition of the Indian treasury, carried its due weight in deciding us to adopt what, on other grounds, seemed to us the wiser alternative. Still, apart from financial considerations, we were convinced that the safety of the afflicted populations would be best secured by the adoption of the course we took. It must, I fear, be admitted that Government cannot avert all death from famine when the drought is so severe and affects so large an area as in the present season has been the case. And I am convinced that under present circumstances there

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would have been more misery, more death, and a less constant supply of food in the districts of Southern India if Government had undertaken to import grain on a large scale than have happened under the policy which the Government of India, after full consideration and with your Lordship's approval, have adopted.

6. These were some of the considerations which influenced our decision when the question of importing grain arose in the autumn of 1876. When the same question came before us in July 1877, such considerations gained renewed force from the experience of the preceding eight months. The proposal to import grain largely by Government agency had been put forward during the autumn of 1876, both at Bombay and Madras. The Governor, Sir Philip Wodehouse, fully and specifically discussed the question with his colleagues; and they decided not to buy grain, but to trust entirely to private trade for the supply of the country. This decision, cordially approved as it was by the Government of India, was at once made public. Grain was forthwith consigned to the Deccan by private traders in enormous quantities; insomuch that the Great Indian Peninsula Railway was blocked with grain early in November. By strenuous effort the block was gradually cleared, and the supply by rail and seaboard to the famine districts of Bombay has since November sufficed for the needs of the country. Prices have indeed been very dear; but, though some parts of the Bombay famine tract drew their supplies from railway stations or seaports 130 miles off, still there has always been enough grain in the markets.

7. The Madras Government, about the same time as the Bombay Government considered the question, decided to buy 30,000 tons of grain as a beginning. This decision was not known to the Government of India until the transaction was concluded and the bill had to be paid. The purchases were effected with just so much secrecy as served to alarm the trade; and in Calcutta, the chief source of the Madras rice supply, dealers were, until the middle of February, possessed with a fear that further large purchases by Government were imminent. Interference with the grain market was stopped by the Government of India; and, whatever may have been the views of the Madras Government at the time, I believe the Governor of Madras is now, and has for some time been of opinion that further Government purchases of grain were inexpedient. The Madras Government made their purchases in October, and as no further action of the kind was taken the stream of private trade set in during December, and has continued ever since. Private trade has sent by sea to Madras, or has consigned from marts in Northern India, more grain than the railways and other means of transport could carry into the interior. During the last two months (August and September) since the failure of the summer rains and the occurrence of a second famine, private trade has carried into the districts of Madras and Mysore a daily average of 4,000 to 5,000 tons of food. This great result must be largely due to the assurances, published by the Governments of India and Madras in June last, to the effect that Government would not interfere in the grain trade. These were the assurances to which we referred in our telegram quoted in the first paragraph of the present letter.

8. The grain bought by the Madras Government is being kept in reserve, and so its presence does not operate to keep prices low, and thereby to check importations. I am aware that the Members of the Madras Government, though they do not now advocate Government purchases, are strongly of opinion that their purchase of 30,000 tons, and their placing the greater part of that supply in depôts up the country, paved the way for private trade, and encouraged its steady flow. It is true that private trade increased after the Government purchases had been made; but trade did not acquire its full stream till August 1877, and it did not flow freely at all till December 1876, that is to say, some weeks after the Government transactions had been concluded; whereas the Bombay importations set in with full tide early in November. I do not say that the purchase of 30,000 tons permanently affected the flow of private trade in the face of the enormous demands of the Madras and Mysore country; but I fear the transaction must (for the time) have checked private importations; it is certain that the Government grain occupied railway waggons to the exclusion of merchants' consignments, and I can see no practical or theoretical ground for the contention that the Government purchases galvanised private trade into active exertion.

9. Though the considerations stated in the foregoing paragraphs guided our unanimous decision on the occasions when the question of purchasing grain came before us during the present famine, yet we must not be understood to say that occasion never did, and never can arise, when Government purchases of grain might be necessary. The Orissa famine of 1866 may have been such a case. Orissa was a small province; it had then few transactions with other parts of India; its marts were not frequented by merchants from other provinces; there were practically no land communications between

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Orissa and other provinces, save for pilgrims; and communication by sea was at that time cut off during the most critical season of the year. The famine of 1866 in Orissa may have been a case in which Government might in some way have effected or promoted grain importations. In the famine of 1874 the Behar famine tract, with its population of 19 millions, was divided by the Ganges into nearly equal parts; one part, south of the Ganges, possessed two railways, metalled and bridged roads, and large trading populations; the other part, north of the Ganges, had no railways, not a single metalled and bridged road, and comparatively few traders. Thus the Government was able to occupy North Behar with its agency and with its grain imported from the east; while the wants of South Behar were sufficiently met by private trade with supplies from the west. The circumstances and characteristics of the two tracts were so different that Government trade in North Behar did not interfere with private trade in South Behar; and furthermore all the Government grain came by railway or river from the east, while the railway from the west was left exclusively for private traders. The famine tracts of Southern India, on the other hand, are not landlocked like Orissa; nor are their seaports closed for months together as were the Orissa roadsteads. There are several railway lines in the south of India; a number of seaports are available on the east and west coasts; Madras possesses a better system of metalled and bridged roads than any part of India; much of the Bombay and Mysore country is also well supplied with roads. There was thus every facility for the free action of private trade. Nor was there any section of the famine country so separate and distinct from the rest that Government agency could have imported grain thither, while private trade supplied the remainder of the country without let or hindrance.

10. I have laid before your Lordship thus at length an expression of my views on the subject of this letter, because I think its importance is very great. If your Lordship were able to concur generally in the views now expressed, the hands of the Government of India would be greatly strengthened when hereafter the problem of supplying food to a famine-stricken province again arises.

11. In any case the traders of Southern and Northern India will have learnt an important lesson of self-help. Private trade will be more prompt than heretofore to supply the wants of provinces where scarcity of food may prevail. I anticipate also that, after the brisk and lucrative trade of this year, traffic on the Madras guaranteed railways will never fall again to the low ebb of former years. And I hope that the opening of the Dhond and Munmar Railway will do much to produce free interchange of commodities between the north and the south of India, which now for the first time have traded on a large scale with each other.

I have, &c.
(Signed) LYTTON.

Encl. in No. 253.

No. 247.

Telegram, dated 22nd September 1877.

From the Governor, Madras, to Viceroy.

Clear line. Charitable relief committees to remove misapprehension on part of officers which is doing harm, propose to issue following notification:—

"It is the desire of Government that public servants of all grades should give all the "assistance they can render, without detriment to their official duties, to the formation "of local committees, and generally to promote the objects which the famine relief "committee and subscribers to the famine relief fund have in view." Oblige by acknowledgment.

No. 248.

Telegram, dated Guneshkhind, 23rd September 1877.

From Viceroy to Secretary of State.

Season telegram, 15th to 23rd. Madras, good general rain in all districts, except parts of Coimbatore and small part of Salem, Tinnevelly, Madura; tanks filling, crops reviving; petty harvests being reaped, moderate outturn, prices slightly cheaper in some districts, elsewhere stationary.

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Numbers on works, 698,476, gratuitous, 160,501. Grain supply maintained. Bengal despatches to Madras 3,800 tons daily; Peninsula Railway delivers to Madras 960 tons daily; railway working better.

Bombay, good rain, prospects improving everywhere, except large parts of Khandesh, Nassik, Ahmednagar; prices slightly falling; autumn crops small in area, but thriving; winter crop sowings progressing. Number on works, 242,860; gratuitous, 160,380. Pressure of prices and scarcity still severe.

Mysore, good rain over province, 5 to 8 inches during month of September, tanks filled, crop prospects improved greatly.

North-west Provinces, little rain anywhere; hot winds. Lieutenant-Governor telegraphed yesterday, unirrigated autumn crop ruined in Meerut, Rohilcund, Agra, Lucknow, Seetapore divisions; condition critical in Rai Bareilly, and part of Benares division, remainder barely half average yield expected, irrigated autumn crop small, fodder scarce, spring crop sowings in northern divisions possible if rain comes in 20 days. Price of wheat, 20 pounds per rupee. West of Allahabad relief works opening in Rohilcund and Agra divisions.

Punjab, only partial showers. Lieutenant-Governor telegraphed yesterday, autumn crop almost lost, save on irrigated land which are large, spring crop sowings possible till December, if yield good; distress from loss of autumn crop very large. Prices remain high in Indore. No rain in Central India States; pressure in Gwalior increasing greatly, and continuous emigration thence. Rajputana, few light showers; much failure of crops and pasture in north and east. In Ajmere prices very dear. Hyderabad, good rain everywhere, prospects much improved. Bengal, Assam, Burmah, Central Provinces, prospects generally favourable.

No. 249.

Telegram, dated 24th September 1877.

From Secretary of State to Viceroy.

Yours 22nd.

Do figures given include loss of revenue and famine expenditure in 1876–77 as well as in current year, thus representing total cost of famine?

Encl. in No. 271.

No. 250.

Extract from the Proceedings of the Government of Madras, Revenue Department, No. 2,847, dated 24th September 1877.

Revised Instructions for the administration of Famine Relief in the Madras Presidency.

His Grace the Governor in Council is pleased to issue the following instructions for the guidance of all officers concerned in the administration of famine relief:—

1. Under the successive orders of the Madras Government relief has been sanctioned to famine-stricken people—

(1st) in the form of wages for work done;

(2nd) gratuitously in camps, relief-houses, and villages to those unable to labour or temporarily incapacitated for work.

2. It has been determined that both relief by employment on works for the strong and gratuitous relief to the infirm shall be continued.

3. To enable employment on large public works to be more extensively and systematically carried on, the Government of India have agreed to lend a large additional force to the Public Works Department, and to enable collectors to duly watch the distribution of gratuitous relief, the Government of India have placed at the disposal of this Government a large number of European officers to supervise relief operations in the several taluks of the distressed districts.

4. In order that the wishes and instructions of his Grace the Governor in Council may be clearly understood, the conditions under which relief has been sanctioned and is to be continued are subjoined.

5. Collectors and civil officers are responsible for sending to relief works or for providing gratuitous relief, under the orders now issued, to all who have not adequate means of supporting life. The Public Works Department officers are responsible for providing a sufficiency of work in every distressed district for the employment of the persons who may be sent to them by the civil officers, and shall employ thereon all those so sent.

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Relief Works.

6. The intention of his Grace the Governor in Council is that all relief shall be eventually given through relief works, closed camps, and village relief.

7. Relief works affording to indigent persons capable of some labour the opportunity of earning money with which to buy food constitute the backbone of the relief system.

8. These works are of two classes—

(*a.*) Those under the supervision of the Public Works Department or other professional supervision which may for the sake of brevity be called professional agency works;

Professional agency works.

(*b.*) Those not requiring to any great extent professional supervision, and which may for the sake of brevity be called civil agency works. These works will be under the superintendence of the Public Works Department or of the Civil Department according to circumstances.

Civil agency works.

9. Every district engineer will prepare a list of works in his district which may be made available as relief works. These lists should show approximately—

(*a.*) the probable cost of each work;

(*b.*) roughly the proportion of the total cost required for earthwork;

(*c.*) the number of persons who can be employed upon each, and for how long.

10. These lists will be submitted to Government through the chief engineer or the chief engineer for irrigation. His Grace the Governor in Council will sanction them provisionally either wholly or in part, and the works thus provisionally sanctioned may be taken up from time to time as need for affording relief arises, except large works, the commencement of which will be decided by his Grace the Governor in Council. The opinion of the collector should decide which of the works in the list so sanctioned shall be first proceeded with. Estimates to cover such works as may be approved by Government in these lists should be prepared and submitted for final sanction as soon as possible, but the commencement of no such work shall be delayed, where its commencement is necessary, for the reason that a plan and estimate have not been sanctioned. Lists of works which have been commenced, specifying the approximate number of persons who can be received thereon, will be furnished by the district engineer from time to time to the collector, who will send copies to every revenue, police, and famine officer.

11. The very widest publicity of the locality of relief works must be given; the responsibility with regard to this point rests upon the collectors and their assistants.

Publicity of relief works.

12. The distinction between budgeted works and famine relief works is abolished in the following districts:—

Nellore.	Chingleput.	Madura.
Cuddapah.	North Arcot.	Tinnevelly.
Bellary.	South Arcot.	Coimbatore.
Kurnool.	Trichinopoly.	Salem.

And all works whatever therein (Imperial, provincial, or local, excepting only buildings) shall be considered famine relief works, and shall be carried out under all the rules, tests, and restrictions applicable to famine relief works. Any relief works which may be necessary in any of the remaining districts will be carried out as special works under special arrangements.

13. All establishments at present employed under civil officers in supervision of, or in accounting in respect of, relief works should be transferred, with the charge of the several works, to the Department Public Works as soon as the district engineer is in a position to take them over.

14. All persons capable of labour, who are in fair health and condition, must be drafted to professional agency works, and with them must also be drafted such members of their families as are willing to accompany them.

People to be drafted to professional agency works.

15. Weaker people, who are nevertheless capable of some work, should be employed upon civil agency works, but should, as they recover strength, be drafted to professional agency works, the object being to employ the largest possible number of people to whom it may be necessary to afford relief upon works of this latter description.

People to be employed upon civil agency works.

16. Work is to be exacted and musters taken for six days in every week; payment for the seventh day is, however, included in the following scales of wages.

Off-day.

17. The rates of pay to persons who perform their allotted tasks shall be for each working day:—

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Upon Professional Agency Works.

		Rates of Pay. Rs.	A.	P.
For a man the value of 1 lb. of grain - - -	Plus	0	1	6
For a woman „ „ - - -	„	0	1	0
For a child of 7 and upwards, ½ lb. of grain - -	„	0	0	9

Upon Civil Agency Works.

For a man the value of 1 lb. of grain - - -	„	0	1	0
For a woman „ „ - - -	„	0	0	9
For a child of 7 and upwards, ½ lb. of grain - -	„	0	0	6

18. By grain is meant grain of medium quality and of the description in ordinary use at the time of payment among the labourers on the works. The price to be taken at the retail price of the grain ruling at the cusba of the taluk on the previous week.

Grain.

19. When work is interrupted by rain to such an extent that the tasks ordered cannot be exacted, professional agency labourers should be paid civil agency rates and civil agency labourers should be paid the civil agency rate, less 2 pies all round.

Interruption from rain.

20. No work is to be taken from children under seven years of age, nor are such children to be allowed to remain among the labourers while they are working. Such children, belonging to parents or natural guardians employed upon works, must be mustered at a convenient spot at some little distance from where the work is in progress, and placed under the charge of a sufficient number of the women drafted to the works who will be employed as nurses. At large works, and where working camps are established, kitchens must be provided, and these children supplied with rations of cooked food not exceeding ½ a lb. of grain per diem. The nurses must receive their full ration of cooked food, *i.e.*, 1 lb. grain plus the money portion of the wage. On small works officers in charge must make suitable arrangements for effecting the same purpose.

Children under 7.

21. To prevent relief works becoming unduly attractive, three tests are necessary, viz., 1st, *primâ facie* evidence that the individual really requires employment upon a relief work; 2nd, distance of the work from the home of the labourer; and, 3rd, tasks.

Tests.

22. The task to be exacted upon professional agency works is 75 per cent. of what the individual would be able to perform if he worked to the full extent of his ability; upon civil agency works 50 per cent. of what the individual would be able to perform if he worked to the full extent of his ability.

Tasks.

23. In settling and exacting these tasks it will be necessary for the officers concerned to use great judgment, discretion, and firmness so as to avoid oppression of the people upon the one hand or encouragement to idleness and laxity on the other.

24. It may probably be expedient in many cases to take, as the unit for tasking, a gang composed of all the members of one family who are on the work, or a portion of the inhabitants of any one village; and it is the wish of his Grace the Governor in Council that, as far as possible, consistently with economy and discipline on the works, members of the same family should not be separated in their employment. But these points of detail, varying as they will with the size and nature of the work and other circumstances, must be left to the discretion of the executive officers acting under the general orders of Government.

25. The employment of contractors directly or indirectly is absolutely prohibited on relief works.

26. Masonry work requiring skilled labour, such as culverts, tunnels, sluices, calingulahs of tanks, and similar works found essential to the completion of relief works, may be performed by contract in the ordinary way. In selecting works to be placed on the list, Public Works officers will bear in mind that the beneficial effect of the work, as a relief measure, is the principal object; therefore works, of which a large proportion of the estimate is for masonry or compensation for land, should generally be at once laid aside as unsuitable.

27. The distance test is necessarily to a great extent enforced by concentrating relief labour upon a comparatively small number of large works, and until further instructions this test may be deemed to be complied with when the labourer goes to professional agency works and performs the tasks exacted there.

Distance.

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28. The question whether persons are fitting objects for employment upon relief works must be decided by the civil officers, who will refuse employment to all persons except those who are destitute.

Persons not destitute.

29. The civil officers will despatch such applicants for employment as they consider eligible with written duplicate nominal rolls, and the production of such rolls will be the authority to the Public Works Department officers to employ the persons named in them. The rolls shall specify the name and father's name and village of each person, and shall be dated and shall bear the signature of the despatching officer.

Rolls for employment.

30. Where camps are necessary on works these camps will be under the charge of the Public Works officer directing the work, who will make arrangements and enforce rules for strict conservancy and sanitary measures, and select suitable persons from the relief coolies for the various duties of scavenging, water drawing, &c.

Sanitary precautions.

31. In transferring people to works at a distance exceeding 10 miles, it will be necessary under some circumstances to pay them batta. The amount and nature of this batta will vary with local circumstances, but it should never exceed 16 oz. of uncooked grain for each day's march.

Batta.

32. There will probably frequently be exceptional cases arising on works requiring special treatment. It is obvious that what may be sufficient for the vast majority may be unsuitable in quantity or quality in individual cases. Such cases, which will include also those of people arriving on the works worn out and in low condition must, as far as possible, be specially treated under medical advice; and they may be fed in accordance with the scale laid down in G. O. No. 2372 of July 24th, 1877, for people under such treatment. The extra allowance must cease as soon as the person, in the opinion of the medical officer, regains strength.

Special cases.

33. Persons not permanently incapacitated for labour will probably regain health, as soon as convalescent, more rapidly upon a relief work than amidst the surroundings of a relief camp.

34. All labourers must be warned that they are liable to fine and dismissal from relief; but these punishments should be enforced with care and judgment.

Punishments.

35. Short work from idleness should in the first place be met with a small fine, and a repetition of the offence should be punished with greater severity. But, until further orders, the effect of the fine in the case of weakly people must never be to reduce the wages of an individual upon professional agency works below civil agency work rate, nor to reduce those of an individual upon civil agency works below the relief house scale.

Fine.

36. Incorrigible idleness or insubordination on the part of persons in fair physical condition should be met by immediate dismissal.

Dismissal.

37. Payments upon relief works must be made at least twice a week, and oftener if necessary. New arrivals should for the first few days be paid daily.

Frequency of payments.

Charitable Relief.

38. All previous orders relating to gratuitous relief, so far as inconsistent with the following rules, are hereby cancelled.

39. Relief officers will be appointed to the charge of one or more taluks or parts of taluks according to size and local circumstances.

40. Their duties will be to supervise all relief operations within their charges except public works. Their especial duty is to see that the orders of Government are strictly carried out; that relief reaches all who need it; that waste, abuse, and fraud are prevented, and the utmost economy, consistent with due relief, enforced throughout.

41. They are expected to be constantly on the move, and to visit the several villages and relief camps as frequently as possible and at uncertain times.

42. They will furnish to the collector every Saturday information on the following points:—

(1.) The number of cases in which relief has been granted, refused, or stopped.

(2.) Any case of failure of duty, inattention, or inefficiency on the part of any officer or servant.

(3.) The physical condition of the people generally on relief, whether failing, improving, or stationary.

(4.) They will submit any general remarks.

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43. Village relief shall be given either in the shape of cooked food or in money according to the discretion of the collectors and local circumstances, and shall, subject to the provisions of paragraph 53, be confined to destitute resident villagers, who are house-ridden, or otherwise unfitted for or incapable of labour. This class will include such persons as are idiots, cripples, blind, or so old or decrepit that they are not able to support themselves; or young children living with and wholly dependent on such persons; women in an advanced state of pregnancy, or who have been recently confined; and further to qualify for this relief these persons must be without well-to-do friends or relatives on the spot on whom their support would ordinarily and rightly devolve.

44. Immediately on the receipt of these orders officers in charge of taluks shall cause each village to be inspected by an officer not below the rank of a village inspector, and, after careful inquiry into the circumstances of each individual case, shall strike off the register any persons who, from condition and circumstances, do not come within the above description. The relief officer in charge of a taluk or part of a taluk shall visit each village as early as practicable and satisfy himself that his instructions have been properly carried out. No fresh admissions to the register shall subsequently be made, except under the orders of the village inspector, who, whenever he may authorise any such admissions, shall, in his next weekly return, report them to the taluk relief officer, who shall transmit an abstract, showing increase or decrease of numbers in each village of his charge, to the collector weekly, for preparation of the weekly tabular statement for Government. The taluk officer shall take the earliest practical opportunity of inspecting the persons who have been newly admitted.

45. Persons, who, under the operation of the above order, are struck off the registers of village relief, shall at the same time, if capable of labour, be sent to work, and if temporarily incapacitated by illness or any other cause shall be sent to the nearest relief camp to be there maintained and treated until able to work or found permanently incapable.

46. All open camps other than works-camps shall be abolished, and in their place such number of closed camps as may be necessary shall be established. On this point collectors should at once take such steps as may be needed.

47. Until further orders are published for the regulation and interior administration of closed relief camps, the arrangements now in force should continue; but it should be distinctly and clearly understood by the officers in charge that no person capable of labour should be received into a camp, and that as soon as any inmate of such camp recovers strength and condition sufficient to enable him to undertake labour on professional agency works, he should at once be drafted off to such works, which should not be situated within 10 miles of the village of which he is an inhabitant.

48. Officers in charge of camps will recollect that the primary object of the camp is that the strength of its residents should be restored therein, and that they may be thus rendered fit for work. Food and shelter, but no money payment will be given therein. Camp diet is prescribed in G. O., 24th July 1877, No. 2372; but all camps must be so divided as to render it impossible for those not actually requiring it to obtain the special diet allowance sanctioned for those under medical treatment. No person shall in any case be admitted to the higher scale of diet except under the written order of the medical officer of the camp.

49. Collectors will take care and watch carefully the effect of relief operations, and if it should appear that any camp has a tendency to draw to it those who should be relieved in their villages, or any undue tendency is observed on the part of those on works to seek camp relief, the diet must be so adjusted, in accordance with the discretion given by the Government order referred to, as to counteract such tendency.

50. No outside relief shall be given at any closed camp.

51. All able to work will at once be sent to a suitable relief work with a list as described in paragraph 29. In carrying out these instructions, however, the officer will exercised a careful discretion in cases where husband or wife, mother or child, may be ill in camp, and should not enforce separation in such cases. Any able-bodied person so retained temporarily in camp will be required to do suitable work in or about the camp.

52. The collector should keep superintendents of camps informed of all works in progress, and to what extent labour can be accommodated on each work, and the order of the superintendent of the camp to the officer in charge of the work shall be sufficient authority to the latter to receive the persons who may be sent from the camp.

53. Wanderers who present themselves at any village in a state of destitution shall be provided by the village head with one meal, *i.e.*, 10 oz. grain, and he will be held

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strictly responsible that no person manifestly in need of assistance to prevent starvation shall remain unrelieved; but such persons shall only receive one meal and shall be passed on to the nearest relief camp where they shall receive support, or, if needed, medical treatment, or if in a fit condition to support themselves by labour be at once sent to suitable works. In special cases, where necessary, village heads may incur such charge as may be needed to convey to the nearest relief camp destitute persons who cannot travel. But whenever this is done an immediate report must be made to the village inspector.

54. In laying out relief camps, sanitary requirements, especially position of hospital, water supply, and latrines should be very carefully attended to.

55. With the exception of those in hospital, persons in relief camps are not to be allowed to remain idle; they must be employed in all the necessary duties of the camp, its conservancy, water supply, cookery, hospital attendance, &c., or in spinning, weaving, rope-making, or other similar light work. No extra allowances are to be given for work performed in or about the camp.

56. This order, except as regards scales of diet, does not apply to the Nilgiris district, in which the Commissioner's arrangements to meet the special circumstances will continue in force subject to further instructions.

No. 251.

Telegram, dated Allahabad, 25th September 1877.
From Viceroy to Secretary of State.

My telegram, 22nd, gives estimated total Madras and Bombay famine, both expenditure and revenue loss, eleven crores from beginning of famine to March 1878. Estimated loss of Madras revenue, 280 lacs may be exceeded. Madras Government has furnished no figures. Feudatory and possible North-west Provinces expenses are outside the eleven millions.

No. 252.

Encl. in No. 253.

From the Additional Secretary to the Government of India to the Additional Secretary to the Government of Madras. No. 863.

G. G.'s Camp, Amballa, the 25th September 1877.

Your letter No. 2810 of the 20th instant has been laid before the Viceroy, and by his Excellency's instruction I have already in the telegram, marginally quoted, conveyed to you the assent of the Government of India to the issue by the Madras Government of a notification, calling on the local officers to assist in the formation of local committees, and generally in facilitating the objects of the fund.

Telegram dated 24th September.
From the Viceroy to the Governor of Madras.
Charitable relief committee. Your letter of 20th instant reached me before leaving Poona. Under conditions there explained I do not object to your publishing notification proposed in your telegram of 22nd. Am communicating further on the subject by post. The committee's instructions to their deputation have my full approval.

2. The information, however, for which his Excellency asked in my letter No. 773, dated 31st August, as to the specific objects in detail to which the committee propose to devote their funds, is still, I am to point out, but incompletely supplied.

3. Your letter directs the attention of the Government of India to the resolution passed by the committee on the 24th August, and from that resolution you recapitulate the objects of the committee in the following terms:—

"(1.)—Aiding, by contributions, local committees for the relief of the necessitous poor not reached by Government.

"(2.)—Giving contributions towards the taking care of destitute children and the like.

"(3.)—Providing clothes for destitute women and children.

"(4.)—Making allotments towards any special object which seems to come within the scope and ability of the fund."

4. In regard to this recapitulation I have to point out that object No. 1 still needs some further specification and definition, as to the classes of the necessitous poor, which are indicated as not being reached by Government; there may be, as suggested in my previous letter, many such classes, but without further specification of them there is an obvious danger of the operations of the committee overlapping, and, at some points, clashing with, those of Government.

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5. In regard to No. 2 it is to be observed, as already remarked, that Government is endeavouring to maintain all destitute children that may come on its hands during the famine, and there is room for further discrimination between the objects of the committee and those of Government in this respect. The question of providing for the maintenance of these destitute orphan children, after the famine has ceased, is one which may perhaps be deemed worthy of the consideration of the committee.

6. To the third class of operation which the committee propose to undertake, the Government of India have no objection to make; and the fourth merely provides for any exceptional cases which may not happen to fall under any of the former categories.

7. There is still therefore much room for more definite specification of the purposes of the committee, and the Viceroy observes that the committee propose, as further information is received, to complete the work of formulating the objects of their expenditure.

8. In addition to the points above noticed the Viceroy learns from the instructions, which the committee have given to their delegates, that in a general way the committee accept, as the field of their operations, the mitigation of suffering, as distinguished from the duty of saving life which the Government has undertaken through its own agency. The committee also inculcate on their local agents to avoid even indirect interference with Government operations. His Excellency is satisfied, therefore, that so far as in their power the committee will act on different lines, and for other objects, than those already covered by the operations of Government, and in this assurance has consented to the services of local officers being enlisted in aid of the committee; but having regard to what has been said as to the want of definiteness in the scheme of operations hitherto laid down, and the promise of the committee to remedy this hereafter, I am to express the hope, on the part of the Government of India, that the Madras Government will communicate with the committee, and will assist them not only in defining and systematising the aims and objects to which their expenditure may be most usefully expended, but also in regulating the assistance to be given by Government officials so as to reduce to a minimum the anticipated dangers of friction, of increased labour, and of having to satisfy conflicting claims on their time and attention.

9. Having disposed of the main subject of your letter his Excellency desires me to advert to one or two subsidiary matters which have arisen in the course of this correspondence.

The concluding paragraph of my letter of 31st August was perhaps the subject of some misapprehension by the Government of Madras. It was by no means meant to convey an absolute prohibition against Government officers taking part in the disbursements of the committee's funds. It was simply an expression of the Viceroy's hope that the committee would be persuaded to use their own agency as far as possible, and thus to avoid imposing double burthens on the collectorate establishments. The Madras Government, it was anticipated, would have communicated with the committee, would have assisted them in formulating their scheme of operation, and, if these proved ultimately to be at variance with Lord Lytton's suggestions, would have either sought for some means of reconciling them, or else have again addressed the Government of India.

10. Had this course been followed much valuable time would have been saved, much misapprehension would have been avoided, and the Madras Government would not have been misled into believing* that the committee was not relying on the agency of State establishment for the administration of their private funds.

*No. 210. * See paragraph 2 of your letter, No. 2630, dated 3rd September 1877.

11. I am also to point out, with reference to the scantiness of the additional information furnished in your letter, that the resolution of 24th August to which you now refer the Government of India, as exhibiting in a definite form the scope and objects of the committee's expenditure, was the identical resolution referred to, and quoted almost in the same terms, in my letter of 31st August in the paragraph reproduced in the margin. The only divergence is that the third head—regarding the provision of clothes for destitute women and children—was omitted in my letter, under the impression that it was finally negatived after discussion in the meeting of 24th August.

"His Excellency finds on the proceedings of the committee held on the 24th August, a resolution that the fund should be devoted (1) to contributions in aid of local committees for the relief of necessitous poor not reached by Government, (2) to contributions towards the care of destitute children, (3) to making allotments towards any other special objects which seem to come within the scope and ability of the fund."

12. As these very resolutions were specified in my letter, as failing to convey to his Excellency the specific and detailed information which he desired, the Viceroy cannot forbear expressing some disappointment at being again referred to them, after the lapse

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of three weeks, as conveying the requisite definition of the committee's action; but, without dwelling further on the past, his Excellency desires me to express his confident assurance that the Madras Government will accept the responsibility which necessarily attaches to them as administering imperial finances, of ascertaining, and, if need be, of guiding the action of the committee; and that they will, while labouring to further to the utmost the legitimate action of the committee, endeavour, in free and frank communication with them, to regulate its demands upon local officers, and to define and systematise the scope and objects of its expenditure.

No. 253.

No. 37 of 1877.

From the GOVERNMENT OF INDIA, Department of Revenue, Agriculture, Commerce, and Famine, to the SECRETARY OF STATE FOR INDIA.

Camp Dhurmpore, 27th September 1877.

In my letter* to your Lordship I reported the action I had taken for the improvement of famine administration in Mysore, and the communications which I had held with the Planters' Associations of Coorg and Wynad. No. 239.

* No. 35, dated Bangalore, 20th September.

2. I may mention that, in accordance with the arrangement reported in the 23rd paragraph of that letter, I directed before leaving Bangalore that Major Scott Moncrieff, the Chief Engineer of Mysore, should at once visit Coorg, and arrange for a proper system of relief works in communication with the Planters' Association; and I instructed him to take the opportunity of ascertaining and reporting to me the real wishes, not only of the planters, but of the people themselves, on the question of the absorption of Coorg into the Madras Presidency, and its unification with the other coffee-planting districts.

3. Referring to the results of the recent measures in the Bangalore district, which were reported in paragraph 24 of that letter, I have subsequently had an opportunity of conferring with the Deputy Commissioner of the neighbouring district of Kolar, and I found that he was able to assure me of similarly favourable results in his district. In three relief camps, out of 6,500 inmates, 1,600 had been drafted to works, and a similar number remained in the camps; the rest, when told to go to the works, had preferred to take advantage of the recent rain and return to their agricultural pursuits. The state of affairs in this district has greatly improved; tanks have been filled, the rice crop secured, prices have fallen a little, and ryots are no longer coming to the markets so generally as heretofore to purchase imported grain, there having been an increase of their home supply by the incoming of the small ragi harvest* of September. These circumstances have greatly facilitated the weeding of the relief kitchens, and the general execution of my recent orders; and I should have thought it a matter of much congratulation if I could have informed your Lordship that advantage had been taken of the equally favourable weather in Madras to carry into effect with similar promptitude the orders regarding that Presidency which were issued on 31st August.

* Millet.

4. Leaving Bangalore on the morning of the 21st, I was joined at Jollarpett junction by the Duke of Buckingham and General Kennedy; and it was then I learnt, to my disappointment, that during the three weeks which had elapsed since the Government of Madras had publicly announced their entire adhesion to the principles of my famine policy, no subsidiary orders of any kind had been issued with a view of applying those principles to the problems in hand.

5. Even the correspondence of the district officers on famine subjects continued, I learnt, to go through the Board of Revenue as heretofore; and in the more important matters of drafting people from camps and from village relief, on to works, I could not learn that district officers had received any orders whatever. The delay was attributable to the Duke's visit to Ootacamund; but, none the less, it is to be lamented that such an admirable opportunity, as the recent rain has given, of reducing the number of those gratuitously relieved, and of introducing more economical management, was allowed to pass by. The Madras Government are now spending 60 lakhs a month, the greater part of which goes in maintaining a system of relief, at once wasteful, demoralising, and above all others open to peculation. It is not too much to say that if, when the rain of

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the early part of September again made agriculture possible and hopeful, the masses on gratuitous relief had at once been put to work, a great majority of them, as in Mysore, would have preferred devoting their labour to their own fields, and a sum equal to a quarter or a third of the monthly expenditure might at once have been struck off without danger or difficulty.

6. Before the Duke of Buckingham left me to return to Madras I had examined with him and approved the code of instructions which, with General Kennedy's assistance, had been drawn up for the guidance of officers engaged in famine relief, and which the Governor was then about to issue. I have since learnt that these instructions have been published; and as they provide fully for all the principal objects on which the policy of the Government of India lays stress, I have no doubt that the desired reforms will be introduced, and that the main object of my journey will at length be accomplished. Without this security for obtaining some practical result to our deliberations I should have hesitated about returning to Simla, and was prepared to remain some further time in Southern India.

7. Reaching Poona on the evening of the 22nd I was received by Sir R. Temple, and learnt from him that the state of affairs in Bombay was continuing to improve.

8. While at Poona I received from the Madras Government a letter on the plan of operations proposed for adoption by the General Relief Committee of Madras with reference to the questions I had previously asked—(1.) as to the main objects to which the funds were to be devoted; (2.) as to the agency through which the committee proposed to operate. I had deprecated the employment of these funds for objects already undertaken by the State, and I had expressed a hope that, so far as possible, they would make use of other agency than that of the collectorate establishments, whose whole time and attention are already devoted to the relief operations of Government. That your Lordship may have the correspondence before you at once, I enclose the letters noted on the margin for your perusal; it will be seen that, though no sufficient endeavour has been made strictly to formulate the objects to which the committee will devote their funds, and though they do rely to a great extent on the assistance of State establishments, I have been unwilling in any way to hamper them in the work of expending to the best advantage the large sums subscribed, and have therefore sanctioned the issue of a notification directing local officers to give their best assistance to the committee; but at the same time I have requested the Madras Government to assist them in defining, with some attempt at precision, the objects to which their operations can be devoted, without clashing with those of Government; and in regulating the demands to be made on the time and attention of the collectorate establishment.

Nos. 199, 200. Letter of 31st August to Madras.
„ 210. Their reply of 3rd September.
„ 247. Duke of Buckingham's telegram of 22nd.
„ 240, 241. Madras Government's letter of 20th.
„ 252. Viceroy's telegraphic reply of 24th. Official reply of the 25th September.

9. I have now completed my visit to Southern India, and hope to arrive at Simla to-morrow. I have kept your Lordship fully informed from time to time of what I have seen and done; and I trust that my visit may not have been without effect in an improved system of famine administration, in a better economy of our finances, and in the saving of life. Before closing this, the last of the series of letters which I have been addressing to your Lordship during my absence from my colleagues, I wish to place on record my deep sense of the obligations I am under for the ever ready assistance I have received from Sir A. Clarke, who has displayed a loyal anxiety to meet my wishes by placing at my disposal the whole resources of the Public Works Department, on which department I have mainly relied for a trustworthy system of relief works, and who has rendered valuable advice and assistance on all matters in which I have consulted him. I have already informed your Lordship of the admirable readiness with which Sir R. Temple, notwithstanding the difficulties against which he is struggling in the Bombay Presidency, has placed at my disposal some of his ablest officers, and has responded to all my calls for assistance in the way of medical and other establishments. My thanks are also due to his Excellency the Commander-in-Chief, and to the several local governments and administrations for their ready response to the indent I found it necessary to make on their resources, in order to supply the deficiencies in the medical, engineering, and supervising staff in the famine-stricken districts of Madras and Mysore.

10. The latest accounts I have received as to the rainfall and state of crops show that over the Madras and Bombay Presidencies and over the Province of Mysore there has been favourable rain throughout September, and prospects continue to improve; in Burmah and Assam, as well as in Bengal Proper, there has been abundant rain; in one district of Burmah the rain has been excessive; in Behar, the Central Provinces, Berar, the Hyderabad country, and Malwa, the crops are so far

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in good condition, but rain is again required to render them secure; in the Punjab rain is much wanted to enable the people to sow the spring crops; in the North-west Provinces, north of Allahabad, over a great part of Oudh, in Gwalior, and in Northern Rajputana there is already great and daily increasing scarcity, which, accompanied as it is by a failure of fodder for cattle, cannot but cause severe distress during the coming season; indeed, the Government of the North-Western Provinces has already had to open relief works, and already there is daily a large multitude of emigrants leaving Gwalior. Unless, moreover, rain should come within a few weeks, so as to permit of sowing the spring crops, scarcity will probably deepen into famine in large parts of the North-west Provinces, of Oudh, of Rajputana, and of Gwalior. My season telegrams will, however, have told you how matters stand before this letter arrives.

I have, &c.
(Signed) LYTTON.

No. 254.

Telegram, dated 28th September 1877.

From Governor of Madras to Secretary of State.

Yours, 20th. Fears of insufficient warehouse room groundless. Tuticorin storage considered equal 20,000 tons; Negapatam 35,000; confirmed on present inquiry. Rail removal cannot exceed five hundred each; ample shelter Madras. Rains have much improved prospect of crops generally.

Imports to Madras good; insignificant elsewhere. Tank bursting destroyed half mile main line near Moorapore in Salem, Wednesday; expect restoration to-morrow.

No. 255.

Encl. in No. 271.

Statement No. 33, regarding Famine Relief Operations in the Province of Mysore, for the week ending the 22nd September 1877.

Bangalore, 29th September 1877.

The weather during the last week has been all that could be desired; there have been frequent showers of rain with bright sunny weather between. The rainfall has averaged about 2 inches and has been universal, the dry tract mentioned in the previous week's report having received a liberal downfall. Such of the early (dry) ragi as survived the drought has revived beyond all expectation and may yet produce a good crop, but it is not ripe yet. The irrigated ragi and rice are being cut in many parts. The late ragi is looking as well as possible, and the sewing of horse-gram and other rabi crops is proceeding under favourable conditions.

	Inches.
Bangalore	2·6
Kolar	3·1
Túmkúr	1·5
Mysore	1·8
Hasan	2·
Kadur	2·
Shimoga	1·7
Chitaldroog	2·2

The markets continue to be well supplied. The imports by rail have been 4,200 tons, or 1,027 tons more than in the previous week: such temporary ebbs and flows appear to be due to accidental causes. The imports have been sent from the following quarters:—

	Tons.
Madras	3,520
Beypore, Coimbatore, and Malabar	267
Trichinopoly, Tanjore, and Negapatam	379
Other places	34
Total	4,200

On the other hand the exports from Bangalore Municipality, as registered by the octroi officials, have been 1,896 tons, or 33 tons more than in the previous week. They were despatched to the following quarters:—

	Tons.
Túmkúr	346
Bellary and Chitaldroog	279
Mysore	571
Usur (Salem District)	272
Round Bangalore	428
Total	1,896

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3. Prices are again a little easier than in the preceding week. The following statement shows the maximum and minimum prices in the districts of the province :—

	Maximum in lbs. per Rupee. Rice.	Ragi.	Minimum in lbs. per Rupee. Rice.	Ragi.
Bangalore District - -	10½	13	8	11
Kolar „ - -	11½	16	9	11½
Túmkúr „ - -	10	16	9	10
Mysore „ - -	9	14	8	10
Hassan „ - -	10	14½	8	9
Kadur „ - -	9	14	8	10
Shimoga „ - -	10½	12	6½	8
Chitaldroog „ - -	10	16	8½	10

In rice there is a fall of about ½ lb. per rupee, both in the maximum and minimum scales. In ragi the minimum rate is almost unchanged, but in the maximum there is a great fall, in Túmkúr, for instance, the maximum was 12 lbs. per rupee and now it is 16 lbs.

4. The number of labourers on civil relief works has increased from 28,803 to 31,280, a rise of 2,477. The increase runs through all districts except those of the Nagar Division, in all three of which there is an unexplained decrease. In the others the increase is as follows :—

Bangalore - - - - -	236
Kolar - - - - - -	568
Túmkúr - - - - -	1,946
Mysore - - - - - -	128
Hassan - - - - - -	920

But the Bangalore Deputy Commissioner in his own return shows an increase of 2,640. The discrepancy will be inquired into.

5. The Public Works Department returns show 25,271 labourers against 24,942 previously, an increase of only 329. There is a decrease everywhere, except in the Bangalore district, where the large number of relief labourers put on the State Railway and the Túmkúr road brings up the total. A good many of the works are on tanks and have been stopped by the water; in many cases it is reported that the labourers have left to work on their fields.

6. The numbers gratuitously fed in relief camps have fallen from 208,683 to 161,892. The decrease is very general and almost universal, but it is largest in the Bangalore District and Municipality in Kolar, Tùmkúr and Chitaldroog; in fact, in those districts where the numbers were most overgrown.

	Week Ending— September 15th.	September 22nd.	Decrease.	Increase.
Bangalore District - -	61,873	45,795	16,078	—
Do. Municipality - -	26,467	15,342	11,125	—
Kolar District - - -	17,865	8,698	9,167	—
Túmkúr - - - -	46,848	41,297	5,551	—
Mysore - - - -	2,381	2,575	—	194
Do. Municipality - -	680	707	—	27
Hassan - - - -	12,398	12,147	251	—
Kadur - - - -	3,033	2,828	205	—
Shimoga - - - -	4,204	3,984	220	—
Chitaldroog - - -	32,934	28,519	4,415	—
		Total	46,791	

The decrease is partly due to the improvement in the prospects of field employment, and would have occurred in any case. It is partly due also to the enforcing of the conditions of residence and labour, and to the effects made to relegate the paupers to works. Of the numbers in the relief camps of the Bangalore Municipality, which have fallen by 19,000 in the last fortnight, over 5,000 have been put on the State Railway and the adjacent embankment; about 2,000 on the embankment of the Alsur lake; and about one thousand more on different projects, the waterworks, and two lines of road. The improvement in the condition of the labourers is already obvious; they are cheerful, healthy and contented, and those who a fortnight ago were thought hardly able to lift a pickaxe are now doing a fair day's work. Of the rest, some have left for their villages, some prefer to beg about the town, but these will be collected and brought in by the

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police. To every applicant either labour or food is offered: if labour cannot be provided their food is given till the applicant can be set to work. The want of tools is still one of the greatest difficulties.

7. The cost of gratuitous feeding is returned as follows:—

	Per Head.
Bangalore District - - - -	0 13 0
Do. Municipality - -	Not returned.
Kolar - - - - -	0 10 6
Túmkúr - - - - -	0 12 3
Mysore - - - - -	0 15 3
Do. Municipality - - -	1 14 8
Hassan - - - - -	0 12 9
Kadur - - - - -	0 15 8
Shimoga - - - - -	0 8 4
Chitaldroog - - - -	0 10 7

An explanation will be called for of the excessive figures received from the Mysore Municipality.

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PROVINCE OF MYSORE.

(No. 33.)

CONDITION STATEMENT FOR THE WEEK ENDING 22ND SEPTEMBER 1877.

Divisions and Districts.	Area in square miles.	Affected area in square miles.	Population.	Population of the affected area.	No. and description of works in progress under Revenue Officers.					Daily average number of persons employed on works of all kinds under Revenue Officers.		Daily average number of persons employed on works carried on by the Professional Department.		Amount sanctioned up to date of report for works under Revenue Officers.	Expenditure from the above amount known up to date.	Amount sanctioned up to date of report for works under officers of the Professional Department.	Expenditure up to date from the above amount.	Particulars regarding gratuitous relief.					Prices of staple grains in lbs. per rupee.						Average Rainfall for five years in inches, calculated up to 31st March 1876.	Total Rainfall from 1st April 1876, up to 15th September 1877.	Rainfall at Head-Quarters during the present week.	Average Rainfall of the District.	Remarks.
																		Daily average number of persons gratuitously relieved at kitchens and camps.		Grants for gratuitous relief.			Total Expenditure up to date.	Average in ordinary years,		During last week.		During present week.					
																				Amount of private subscriptions up to date.	Amount of Government grant.	Total.		2nd sort Rice.	Ragi.	2nd sort Rice.	Ragi.	2nd sort Rice.	Ragi.					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Nuddydroog. Bangalore	2,914	1,914	828,354	384,968	42	122	122	286	313	6,390	6,626	5,054	7,442	3,52,932	2,51,056			61,873	45,795	1,506	6,61,363	6,62,869	6,65,241	26	60	10	12	10	12	35·	35·04	1·40	2·6	
Kolar -	2,577	2,577	618,954	618,954	54	263	85	402	402	4,758	5,306	3,249	2,683	3,07,985	2,00,060			17,865	8,698	6,108	1,72,366	1,78,474	1,74,830	32	80	10	12	10	13	25·4	30·61	4·95	3·1	
Túmkúr -	3,606	3,606	692,239	692,239	58	108	63	229	258	8,444	10,390	1,911	1,884	2,83,938	2,09,693			46,848	41,297	1,709	4,39,156	4,40,865	4,39,928	28	106	9	11	9	12	27·4	36·66	·40	1·5	
Aeta-gram. Mysore -	4,127	1,470	948,187	118,082	42	20	9	71	69	777	905	5,166	4,614	1,15,844	79,284	34,61,961	25,94,304	2,381	2,575	7,495	30,887	38,382	30,083	24	70	8	11	8	11	34·3	34·88	2·80	1·8	
Hassan -	3,291	2,154	668,417	190,878	42	33	25	100	98	961	1,881	2,382	2,185	1,26,951	1,13,444			12,398	12,147	2,769	1,21,801	1,24,570	1,21,776	32	76	9	10	9	11	34·4	31·96	2·04	2·	
Nagar. Shimoga -	3,797	388	498,976	47,451	23	78	44	145	143	1,272	1,184	1,615	1,662	2,84,221	1,49,952			4,204	3,984	5,615	25,171	30,786	29,935	30	76	8	9	9	10	38·4	37·34	3·33	1·7	
Kadur -	2,294	691	353,925	100,444	13	40	90	143	142	630	219	1,959	1,859	1,06,895	52,149			3,033	2,828	2,573	30,389	32,962	27,766	30	64	8	10	8	13	35·7	39·11	3·57	2·	
Chitaldroog	4,471	4,238	531,360	511,204	42	59	234	331	328	4,714	4,605	3,606	3,441	2,73,463	1,83,544			32,934	28,519	5,853	3,20,911	3,26,763	3,00,062	24	86	8	11	9	13	23·5	25·17	1·85	2·2	
Bangalore Municipality -	—	—	—	—	—	1	—	1	1	877	114	—	—	35,962	33,898	—	—	26,467	15,342	25,711	2,64,490	2,90,201	2,87,347	—	—	—	—	—	—	—	—	—	—	
Mysore Municipality - -	—	—	—	—	1	—	—	1	—	—	50	—	—	49,721	41,707	—	—	680	707	12,510	31,983	44,493	43,586	—	—	—	—	—	—	—	—	—	—	
Total - -	27,077	17,038	5,055,412	3,604,145	323	724	663	1,709	1,754	28,803	31,280	24,942	25,271	18,97,902	13,12,787	34,61,961	25,94,304	2,08,683	1,61,892	71,848	20,96,517	21,70,365	21,20,574	—	—	—	—	—	—	—	—	—	—	

NOTE.—1. The expenditure entered in column 24 includes the amount contributed by private subscriptions as well as the Government grant in aid thereto.
2. The figures entered in columns 17 and 18 are based on the latest accounts received from the Examiner, Public Works Accounts.
3. The figures entered in columns 21 to 24 against the Bangalore Municipality represent the grants and expenditure up to 15th September, the return for the week ending 22nd September, not having been received.

(Signed) A. WRIGHT,
Additional Secretary.

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REGISTER of Rainfall recorded scientifically at the Government Observatory at Bangalore for each week in the year, as the usual monthly averages do not give sufficiently reliable information in a tropical climate.

Week.	Month.	Rainfall—Inches and Cents. Average of 1871, 1872, and 1873.		1874.		1875.		1876.		1877.		Remarks for 1877.
1st	January.	—	—	—	—	—	—	—	—	—	—	
2nd		—	1	—	—	—	—	—	—	—	—	
3rd		—	1	—	—	—	—	—	—	—	—	
4th		—	—	—	—	—	—	—	—	—	—	
5th		—	—	—	—	—	—	—	—	—	—	
6th	Feb.	—	14	—	—	—	—	—	—	—	—	
7th		—	—	—	—	—	—	—	—	—	—	
8th		—	—	—	—	—	—	—	—	—	—	
9th		—	9	—	—	—	—	—	—	—	—	
10th	March.	—	40	—	—	—	—	—	—	—	—	
11th		—	—	—	—	—	—	—	50	—	65	
12th		—	—	—	—	—	86	—	7	—	—	
13th		—	—	—	—	1	56	—	47	—	—	
14th	April.	—	41	—	—	—	31	—	—	2	20	
15th		—	20	—	14	—	—	—	47	—	—	
16th		—	40	—	—	—	—	—	5	—	—	
17th		—	2	—	45	—	15	—	—	—	1	
18th	May.	1	86	—	13	—	—	1	37	—	22	
19th		—	19	6	20	—	85	1	98	—	—	
20th		—	24	1	12	2	39	—	34	1	30	
21st		—	36	3	88	—	35	—	93	—	75	
22nd		1	9	4	28	—	48	—	3	1	15	
23rd	June.	—	39	—	20	1	69	—	1	—	97	
24th		—	10	—	83	1	43	1	42	1	77	
25th		—	88	—	28	—	7	—	21	—	26	
26th		1	15	—	30	—	14	—	67	—	—	
27th		—	14	—	11	1	73	—	75	—	35	
28th	July.	1	11	—	48	—	3	—	45	—	—	
29th		—	71	3	44	—	39	—	2	—	2	
30th		—	19	2	42	—	19	—	23	—	76	
31st		1	8	—	28	—	63	1	66	—	62	
32nd	Aug.	2	42	2	74	1	24	—	20	—	75	
33rd		1	98	1	51	—	59	1	60	1	31	
34th		1	97	1	96	—	86	—	58	—	54	
35th		—	54	1	45	1	59	—	50	—	3	
36th		2	30	4	65	—	—	1	7	4	23	
37th	Sept.	3	24	4	63	—	6	—	3	1	62	
38th		1	5	3	8	1	19	—	—	1	40	Week ending 22nd September 1877.
39th		1	56	2	31	—	54	—	45			
40th		3	12	2	20	—	27	—	72			
41st		1	11	—	59	—	—	—	—			
42nd	Oct.	1	76	1	30	—	45	—	—			
43rd		—	48	2	56	1	39	—	—			
44th		—	5	1	75	—	—	—	—			
45th		—	33	—	82	—	26	—	52			
46th	Nov.	—	47	—	—	—	34	—	—			
47th		—	10	—	—	—	—	—	—			
48th		—	49	—	35	—	—	—	9			
49th		—	42	—	9	—	—	—	—			
50th	Dec.	—	8	—	1	—	3	—	—			
51st		—	1	—	—	—	—	—	—			
52nd		—	—	—	—	—	—	—	—			
		34	66	56	54	22	6	17	34			

Mean Meteorological Results from the Bangalore Observatory Register.	For the week ending 8th September 1877.	For the week ending 15th September 1877.	For the week ending 22nd September 1877.
Reduced atmospheric pressure -	26·944	27·054	27·008
Mean temperature of air -	74·9	76·2	75·8
Maximum solar heat in vacuo -	143·9	145·7	148·8
Maximum in shade - -	82·6	83·2	82·9
Minimum in shade - -	66·7	66·6	66·3
Depth of rain in inches - -	4·23	1·62	1·40

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Encl. in No. 271.

No. 256.

EXTRACT from the PROCEEDINGS of the GOVERNMENT of BOMBAY, Public Works Department, No. 590 P., dated the 2nd October 1877.

Read—

Memorandum from the Chief Engineer for Irrigation, No. 5,887, dated 28th September 1877.

Submitting, for consideration and orders, a letter from the executive engineer for irrigation, Belgaum and Dharwar, requesting instructions, now that prospects of the season are quite assured, and there is no probability of there being any great demand for relief labour, as to the policy Government intend adopting with regard to the Gokak canal works. If it is intended to complete the canal up to the ninth mile, and to construct the main weir and the head works, there will be sufficient employment for his establishment, which is large, well trained, and capable of the management of 20,000 labourers, but to attract labour the canal must proceed as an ordinary public work, and piece-work and the petty contract system must be introduced. Requesting early orders on the subject, as the 5,000 labourers now employed on the canal have expressed their intention of leaving within a month for their homes.

RESOLUTION.—Government at the present time cannot authorise any measures that will tend to keep up the numbers upon this or any other relief work in Belgaum.

2. The chief engineer for irrigation should be requested to submit the complete project for the Gokak canal at an early date in order that the Government of India may be invited to classify the work as extraordinary.

Encl. in No. 288.

No. 256*a*.

Endorsement by the Commissioner of the Pegu Division,—No. 963–1, dated the 2nd October 1877.

Copy of the following, with copy of enclosure, forwarded to the Secretary to the Chief Commissioner, British Burma, with reference to his letter No. 1615–421, dated the 12th instant.

RECENT FLOODS IN THE HENZADA DISTRICT.

From the DEPUTY COMMISSIONER, Henzada, to the COMMISSIONER OF THE PEGU DIVISION, No. 40–2, dated the 27th September 1877.

With reference to your docket, Revenue Department (Miscellaneous), No. 889–1, dated the 17th instant, I have the honour to submit a detailed statement showing the probable extent of the destruction of crops caused by the recent floods, aggregating 59,100 acres, or nearly one-fourth of the entire rice crop of this district.

The return is made up roughly, and is founded on information furnished by the Thoogyees and others, and upon my own observations in the course of a visit to the inundated lands in Tharrawaddy, from which I have just returned. Although the water of the Irrawaddy was, I believe, little over a foot higher than it was in 1875, the Meit-ma-kah rose some four or five feet higher than upon that memorable occasion, and the destruction has in consequence been very much more widespread; added to this the first replanting in that quarter was entirely destroyed by the rise of the end of August, thereby using up the greater part of the stock of reserve seedlings, and leaving insufficient for a second complete crop.

I regret to have further to state that the prospects of a supplementary crop are much less favourable now than they appeared a fortnight ago. The want of rain and hot weather which has prevailed are against the chance of the seedlings (which are becoming too mature for transplanting) surviving or attaining to vigorous maturity. Of the damage caused by the three breaches in the embankment, that near Zaloon is accountable for about 8,561 acres; that at Kyanghin has permitted the flooding of the whole of the "protected" land, 2,900 acres; the third breach on the Laymyethna embankment, near Dambee, has caused danger to but 160 acres.

The river is again full up to the brink, and the flow through the breach near Zaloon is renewed to the utter destruction of the seedlings put in since the flood abated.

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I believe the figures given in the statement submitted, though as near as can be at present ascertained, represent the outside estimate of the damage; and I think that one fourth may be deducted from it for lands which will be still utilized by planting out or broadcast hand-sowing.

The remaining crops in the district promise remarkably well.

Floods in the Bassein District.

From the Commissioner of the Pegu Division to the Secretary to the Chief Commissioner, British Burma,—No. 953–135, dated the 1st October 1877.

I have the honour to forward herewith for the Chief Commissioner's information copy of letter No. 36–13, dated 17th September last, together with a memorandum in original by Mr. A. L. Hough, Extra Assistant Commissioner, containing a complete account of the breaches made in the Nga Woon embankment in August last.

2. It will be seen from Mr. Hough's memorandum that there is very little, if any, foundation for the report made by a subordinate of the Public Works Department that the first breaches were intentionally or maliciously made.

All the damage would appear to be due to the intrinsic weakness of the bund in places where its foundations are composed of loose friable soil. Although the water in the Nga Woon rose one and a half foot higher than it has ever been known to rise before, the bund did not give way because it was overtopped by the water, but because its foundations were sapped and carried away.

The Deputy Commissioner remarks from personal observation:—"In many places the "water percolated through nearly the thickest part of the bund, and it was with the "utmost difficulty that the workmen and villagers could prevent the underneath part of "the bund sliding away in a liquid mass."

Mr. Hough's experience is the same. The foundations first were eaten away. The superstructure naturally subsided, and then the water rushed in and carried everything away.

The bund, therefore, appears to have been deficient in breadth of base rather than in height.

Out of the 15 breaches in the Bassein district, 13 were made before the water reached its highest level.

3. Notwithstanding the immense volume of water which poured through the breaches, and submerged the villages inside, it is satisfactory to learn that no lives were lost, though many must have had narrow escapes, and amongst a less amphibious population loss of life would probably have occurred.

At one place Mr. Hough remarks:—"Women came and begged for boats to go and "bring away their children, whom they had had to place upon trees as the water had "driven them from their homes."

A few cattle are supposed to have been drowned. The loss of household property is not given. The greatest loss of course is in the standing crops.

The Deputy Commissioner roughly estimates the area over which the crops have been destroyed as 47,767 acres; and but a small portion of this is likely to be planted out again, the season being so far advanced, and seedlings not being easily procurable.

It may be reckoned that an area of 40,000 acres at least will be lost this year.

This is out of a total of about 260,000 acres in the whole of the Bassein district.

4. Colonel Davies appears to have been making very zealous but, I fear, somewhat useless endeavours to induce the people to attempt the cultivation of dry weather crops, such as gram, sessamum, &c. in their paddy-fields. To succeed in raising a dry weather crop out of the ordinary paddy kweng of the delta would be very creditable to a scientific agriculturist; and it is hardly to be expected therefore that the inexperienced peasants of the country should succeed on the spur of the moment in performing such a feat.

5. All the local officials appeared to have laboured zealously, and done what they could to avert the calamity.

The Deputy Commissioner, Colonel Davies, I regret to say, succumbed to the fatigue and exposure which he underwent, and has since been dangerously ill.

Mr. Hough mentions some of the native officials who did good service, but his list is not complete. He has been requested to furnish another and more complete list.

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Encl. in No. 288.

No. 257.

MYSORE FAMINE CODE, 1877.

This code is issued, with the sanction of the Chief Commissioner, for the instruction and guidance of all officers engaged in relief operations. That part of it (Chap. I., Sec. I.) which relates to the duties of the D. P. W. officer has been drawn up with the approval and under the instructions of the chief engineer.

Undoubtedly experience will bring to light errors and omissions in this code, which is issued now as a tentative measure, and the undersigned will be glad to receive suggestions and criticisms from all quarters, and especially from all relief officers.

C. A. Elliott,
Famine Commissioner.

Bangalore, 2nd October 1877.

FAMINE CODE.

Preface.

The backbone of the famine policy is the employment of all suitable applicants for relief on large works of permanent utility superintended by professional officers of the Public Works Department. It is the duty of the civil officer to decide who are suitable applicants, *i.e.*, who are sufficiently able-bodied for labour. In the present state of this province it is not intended, until a crop is harvested, that any applicant should be rejected on the ground of being too well to do, provided he submits to the three tests :—

(1.) The distance test—which shows that he is willing to labour at a distance from his home, not returning there at night but being hutted on the work.

(2.) The wage test—*i.e.*, that he receives a wage calculated to provide a bare subsistence for himself, but not enough to support any non-working member of the family.

(3.) The task-work test—*i.e.*, that he performs a daily task proportioned to his strength.

It is important to remember that, while it is desirable to secure the best return in work for the expenditure incurred, the main object of opening and carrying out a relief work, is not for the sake of the work, but for the sake of the labourers employed on the work.

On every large public work there will, if possible, be placed a civil officer to co-operate with and assist the Public Works officer, and a medical officer to take charge of the sick and those requiring special treatment. There will also be three classes of labourers.

Class I.—The moderately able-bodied, who can on an average perform 75 per cent. of the task usually accomplished by an ordinary cooly. Some members of this class will be fully able-bodied; some, though strong themselves, may have a sickly wife or child; some may be reduced by privation below their usual strength. But the class, taken as a whole, counting the stronger with the weaker members, should be able to perform the 75 per cent. condition, and should receive the higher or A. scale of wages, *vide* Appendix I.

Class II.—Those who are weakly, but are still able to work, and can on an average perform 50 per cent. of their ordinary task. This class will consist mainly of those who are old, infirm, partially disabled by some natural defect, or who are temporarily enfeebled by famine, but whom regular work and regular pay may be expected to restore. These should receive the lower or B. scale of wages.

Class III.—Those who are too much emaciated to do any but a very light task, but who under special care may be expected to improve, and whose health and self-respect will be best consulted by employing them in easy open-air work. These are called the class under Special Treatment. They will receive the A. scale of wage, in the hope of restoring their strength and fitting them to be drafted among the able-bodied, in addition to any extra nourishment the medical or the relief officer may prescribe. Old and decrepit persons who cannot be expected to improve in strength are not to be included in this class.

The civil officer will classify the applicants as they arrive according to these three classes, and will from time to time, as they improve or retrograde in strength, suggest their transfer from one class to another. The medical officer will see to the special

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treatment of all those who require extra food and nourishment, and for whom the ordinary wage is not sufficient. The D. P. W. officer will receive the gangs and individuals made over to him, set them to work, register and number them, measure up the work they do, and see to their payment and their hutting. Accordingly, the code treats in separate sections—(1.) of the duties of the professional officer of the Public Works Department; (2.) of those of the civil officer; (3.) of those of the medical officer.

II. Civil relief works are supplementary to large P. W. D. relief works, and may be employed in three ways:—(1.) as a safety valve for labour when there are more applicants than the Public Works Department can receive; (2.) as a training school for P. W. D. work, when it is desired to move bodies of men to considerable distances, and they are broken into this by being organised and accustomed to work together in gangs for a short time near their homes; (3.) to give employment to the old and decrepit who do not come up to Class II., *i.e.*, cannot do half an ordinary day's work, and who will not be restored to strength by liberal treatment, and so must not be put in the special treatment class.

The petty relief works, on which small bodies of 10 or 20 labourers have hitherto been employed, being paid by piece-work or by contract, and under no real supervision, are to be discontinued. No work will be undertaken as a civil relief work which will not afford employment for at least 300 people for one month. They will be hutted on the work, and not, except in the second case referred to above, allowed to go to their homes at night, and each work will be supervised by a responsible civil officer. The second chapter of the code expounds the duties of the civil officer with relation to civil relief works.

III. The third main division of the scheme of famine policy is the relief camp. These camps are not to be used, as has generally been the case hitherto, as dining places, where people come for a meal or two meals a day and go away. Every person who receives relief at a relief camp must submit to two conditions:—(1.) residence in the camp; (2.) work. The camp must therefore be enclosed, and be provided with sufficient shed accommodation for its population. The able-bodied should not be received there but sent at once to a work. The weakly applicant should also be generally sent to a relief work, but may sometimes be detained a few days to be fed up. The ordinary population should consist entirely of the old and infirm who are not likely to improve, and of the sick in hospital. For all these, except the sick, such work as they are capable of should be provided.

IV. The fourth main head of the code is Special Treatment. The Chief Commissioner's Proceedings, Famine Department, No. 5, dated 11th September (*vide* Appendix I.), prescribe the ordinary wages on P. W. D. and civil relief works, and the ordinary ration in relief camps. But there are many cases in which the ordinary rates will not apply. Small and emaciated children, nursing mothers, who either themselves or their babies are suffering from innutrition, young and middle-aged adults of both sexes who have been temporarily brought down by starvation, women advanced in pregnancy, convalescents out of the hospitals, these form the chief classes of "special cases" who require "special treatment." No part of the relief officer's duty (whether he be P. W. D., civil, or medical) is more important than the selection of cases for special treatment and seeing that the orders he gives are carried out.

V. The fifth chapter in the code treats of village inspection and relief. This is especially the duty of the civil officers of the district, and unless it is zealously and carefully performed it is impossible for them to find out the true condition of the people of their district, or to know if there are many people in the villages who need relief, but are too proud, or too frightened or too resigned to their fate, to apply for it.

It may often happen that an officer may inspect a village once a week for three weeks running, turn out the inhabitants and find them all looking stout and comfortable, and on the fourth week may see that distress and emaciation have suddenly set in. Then he will act by sending the people on to relief works or into relief camps, and seeing that they go; but without this inspection he may be startled by suddenly finding a large influx of famine-stricken people who have come in too late to be saved.

Special relief for artisans who are unfitted for manual labour is provided by supplying them with the raw material of their trade, and for this purpose it is necessary to provide for the careful house-to-house inspection of all large towns.

Finally, every officer employed in connexion with relief operations, of whatever rank, is held personally responsible that measures adequate to the distress are used, that

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unusual or impending distress is early brought to notice, that no question of form is allowed to impede relief, and that all orders are carried into execution.

Relief must never be allowed to run short so long as relief is necessary; foresight must be exercised, and one work planned as fast as another draws near completion, or as fast as there are indications of an influx of labour. A list of works which are ready to be undertaken should be drawn up for each district, so as to be available whenever there is a fresh demand for work. No officer will be held excused for turning off gangs of labourers on the completion of a work, or for refusing *bonâ fide* applicants for labour, by the plea that he had not received a sanction.

CHAPTER I.

Section I.—Duties of the D. P. W. Officer.

Preparation.

I. The executive engineer or other officer placed by the chief engineer in charge of a relief work will, after completing his preparations, give information to the Deputy Commissioner of the district that on a given day or at given dates he will be prepared to receive so many labourers to be made over to him at such a place.

Location of classes.

II. He will divide the work out so as to locate in separate parts of it the gangs belonging to the different classes :

(1.) Able-bodied.
(2.) Weakly, but fit for labour.
(3.) Special treatment.

Division of classes into gangs.

III. When the labourers arrive (they will be already classified by the civil officer according to the above three classes) he will distribute them into gangs, allowing those of the same or neighbouring villages as far as possible to work together, and, where the prejudices of the people require it, those of the same caste. Each gang will ordinarily consist of about 50 people under one gangsman or head cooly; men, women, and children being associated in due proportion; and about four to six gangs will be under one writer who will keep up the nominal register.

Nominal Registers.

IV. The first duty will be to frame nominal registers of labourers, showing the name, caste, and village of each, and the date he was taken on the work. The roll will be called daily, and those who are absent for part of the day will receive half a day's pay; if absent during the whole day, no pay for that day.

Hutting.

V. The next point is the hutting. Instructions have already been issued (*vide* App. No. II.) as to the kind of hut which should be put up to contain one family. The earthen walls and raised floor should be the labourers' task, the mats for the roof are supplied by the D. P. W. officer. Huts to accommodate about 10 per cent. of the numbers expected may, if necessary, be erected before the arrival of the relief labourers; but this need not be done, if there is any available accommodation on the spot. As to the selection of the site of the camp, and the general rules which should guide its laying out, the instructions of the Bombay Sanitary Commissioner (App. No. III.) should be followed as far as possible.

Task work.

VI. The first day or two will be occupied in organizing and hutting the labourers, and for those days full wages (scale A for Classes I. and III., scale B for Class II.) should be given. When the labourers are thoroughly organised and set to work, task work should be exacted from them, not individually but by the gang, the work of each gang being measured up weekly or twice a week. Task work must not, however, be exacted rigidly during the first few days, especially from those who are at all feeble. The able-bodied who are in Class I. are expected to do 75 per cent. of the work done at ordinary times by an able-bodied cooly; if they do less they should be cut down to the lower wage (scale B). Those who belong to Class II. (weakly but fit for some labour) are expected to perform 50 per cent. of the full task which they could ordinarily perform; but if they do less, their wage (being calculated at the minimum sufficient for supporting life for seven days by six days' labour) should not be cut, unless the D. P. W. officer is quite satisfied that the failure to work is wilful and not due to weakness. He should exercise great discretion and patience here, should warn the people two or three times, and if that fails he may deduct the condiment portion of the wage. But this penalty should not be repeated without consulting the civil officer, lest the labourers should begin to fall off in condition. From the 3rd class, those under special treatment, no task can be demanded. The amount exacted as the task in each kind of labour should be reported by the P. W. D. officer to the superintendent engineer, who

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will see that the rates are fair and not excessive. No work will be exacted on Sunday and no wages paid, the rate of wages for working days being calculated so as to leave a margin over for Sundays.

Payment of wages.

VII. It will generally be necessary at first to pay the labourers daily, and after a time twice or thrice a week; but weekly payments should be the rule for the able-bodied gangs (Class I.), and should be introduced as soon as possible, without inconvenience and loss to the labourers. When the work has been going on for some time, and the grain merchants acquire confidence in the system, and know that a labourer whose name is on the roll is sure to be paid at the end of the week, they will readily give him credit during the week. But facilities must be given for any labourer's departure from the work at any time for his home, provided there is reasonable presumption that he can support himself when he gets there. He must be paid up and let go even in the middle of a week. All payments must be made in cash; no cooked or raw food is to be given except to the people who are under special treatment. Payments will be made on nominal registers or muster rolls, which should be checked as expeditiously as possible in order to avoid any delay in making the week's payment. They must not be made through low-paid underlings but by regular cashiers borne upon the strength of the establishment, from whom good security should be required. Officers in charge will be expected to check payments, and inspecting officers, civil or D. P. W., must, on visiting a work, endeavour to satisfy themselves that the full Government wage reaches the cooly, less duly authorised cuttings. When required by the civil officer, arrangement should be made for paying new arrivals an interim payment after they have been one or two days on the work.

Shelter for infants.

VIII. Shelter should be erected, in which the infants and children too small to labour, belonging to people in the working gangs, may be collected. About 20 children may be placed together under the care of a woman, who is herself a nursing mother, or otherwise entitled to consideration through age or infirmity. The shelter should be at such a distance that the children of mothers belonging to the gangs should not interfere with the work, but should be within easy access of their mothers. Any of these children who are weakly will be treated and fed as special cases.

Information as to room on the work.

IX. The D. P. W. officer will weekly send a slip in the following form to the Deputy Commissioner of the district, who will circulate it to such of the relief officers under him as he considers proper.

Name of Work.	Number employed on the of .	Additional number to whom employment can be given on or after the of .

Expiry of sanction or completion of work.

X. When a sanction is approaching expiry, or when a relief work is approaching completion, the D. P. W. officer should make timely report to his immediate superior to enable him to pass such orders as may be necessary, and shall also inform the Deputy Commissioner.

General responsibility of the Department Public Works officer.

XI. In cases where a civil officer cannot be spared to be placed on the relief work, the duties which ordinarily belong to him will devolve on the D. P. W. officer, and especially those defined in rules IV., V., VI., VII., VIII., and IX., section II. Every officer in charge of a relief work will be held responsible for the condition of his people, and for the prompt and judicious carrying out of all orders laid down.

Outbreak of epidemic.

XII. The outbreak of any epidemic disease, and especially of cholera, should be immediately reported to the civil officer, or, if there is none present, to the Deputy Commissioner of the district, and also direct to the chief engineer.

Form of weekly report.

XIII. Every officer in charge of a relief work will make a weekly report in the form appended (Appendix No. IV.). The condition and health of the labourers should be specially noticed, and the cause of any increase or decrease in numbers should be explained.

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CHAPTER I.

Section II.—Duties of the Civil Relief Officer.

N.B.—The term Civil Relief Officer is applied to a Deputy or Assistant Commissioner or a Special Relief Officer, not to an Amildar.

I. The Deputy Commissioner, on receiving information from the executive engineer or other D. P. W. officer of the number of relief labourers who can be entertained at a given place on a given date, will decide from what taluk or taluks the numbers are to be sent, will instruct the relief officers of the taluks accordingly, and will, if possible, appoint a civil officer to cooperate with the D. P. W. officer on the new relief works.

Drafting of gangs on to relief works.

II. The civil relief officer in charge of a taluk, on hearing how many people he is expected to send to a relief work, will first of all select the number from the relief camp or camps in his taluk. He will be careful not to draft on to relief work those who are too emaciated to do any work at all, or to benefit in health by the move. In the first instance, when the gangs drafted are large, and the people have long been accustomed to gratuitous relief, there will be unwillingness to move, and timidity. This must be overcome by tact and exertion. The relief officer should himself march the earliest gangs to the relief work, so as to prevent any desertion by the way, or he may send them in the charge of a trusty superior official, such as the amildar. When the system is well established, and the people have confidence in the work and crowd to it instead of shrinking from it, it will be sufficient to place the party under the charge of a gangsman or peon or constable, according to his discretion, and to send with him a slip of paper showing so many persons of the 1st class, so many of the 2nd, so many of the 3rd, despatched on such a day, to reach the relief work on such a day. The relief officer will in either case distinguish the individuals by giving to those whom he ranks in Class 1 a paper ticket marked A, to those of Class 2 a ticket marked B, and to Class 3 a C ticket. These tickets are to be delivered up to the D. P. W. officer on arrival.

Batta or travelling allowance to labourers.

III. Batta will be given to the labourers according to the distance to be travelled. If it is not more than one day's march, the best plan is to give them a meal in the morning before starting, and a meal in the evening on arrival. If the distance is more than one day they should either be halted for the night at a relief camp, having an order on it for food, or else at some police station, or some village, the patel of which is known to be trustworthy, where the police officer or patel would on production of the relief Officer's order provide the party with food. The allowance should not exceed 16 oz. of grain, raw or cooked, for each day. Money should not be given to the labourers themselves till they arrive.

Reception of applicants by civil relief officer.

IV. The civil officer on the relief work should receive these labourers, and make them over to the D. P. W. officer. When the first start has been made applicants for labour on the work should apply direct to the civil officer, who should establish a fixed place at which to receive all applicants every morning, in order to classify them and send them on to that or any other work.

Distance test.

V. In all cases the "distance test" should be enforced, tentatively and cautiously at first, more strictly afterwards. People should never be sent to work close to their homes, but a little distance off. The Deputy Commissioner should enforce this test by the direction he gives as to what taluks should supply what work. As a rule the labourers from a relief camp in one taluk should not be sent to a relief work in that taluk, but elsewhere; but the rule should be introduced gradually, the people being employed at first a little distance off, then when they are organized and accustomed to work in gangs, and have got to know each other and the gangsman, and to have confidence in the system, they can be marched to greater distances. Similarly when applicants come to the civil officer on a relief work, if the work is one stretching over some miles, he will send them to that part of it which is farthest from their homes.

No applicants to be rejected.

VI. The civil officer may refuse to send to the work people who are obviously unfit for relief, who wear gold ornaments, rich clothes, &c. But in the present state of the province he is not authorised to refuse employment to any who apply, merely because they are fat and strong and in good condition. It is believed that the enforcement of the three conditions—

1. the distance test,
2. the wage test,
3. the labour test,

are sufficient to prevent the danger of the work becoming too popular.

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VII. The civil officer should move daily up and down the work and inspect the gangs; if he sees any falling off in condition, or any improvement, he should suggest to the P. W. D. officer to remove them from one class to another; he should see that there is a bazar sufficiently stocked, at which food can be got at reasonable prices; he should supply the P. W. D. officer with a statement of the price of grain at the end of each week in order that the rate of daily wage for the next week may be found from the sliding scale; he should occasionally inspect the payment of the gangs and should see that there is no peculation and no unlicensed deduction made from their wages; he should carefully watch the carrying out of the orders as to special relief to infants, to nursing mothers, and to the sick and emaciated. **Constant inspection and supervision.**

VIII. Every civil officer in charge of a relief work will receive a permanent advance of Rs. 100 to enable him to give food or money to applicants the first day they arrive on the works, and to meet any exceptional expenditure. He will send in to the Deputy Commissioner on every Monday an account of his expenditure under this head for the previous week, and also a weekly report on all points of interest and importance. **Permanent advance.**

X. Relief labourers should be encouraged to bring their whole families with them to the works, and relations of labourers who arrive subsequently should always be taken on, if fit for labour. Attention to this point is particularly necessary when any deterioration of the labourer's physique becomes apparent, and inquiry will probably show that he has been endeavouring to support members of his family on a wage intended only for himself. Inspecting or superintending officers will therefore be expected to watch narrowly the proportion of young children on the works and to take immediate steps when that proportion is improperly small. **Entire families to be brought on works.**

CHAPTER I.

Section III.—Duties of the Medical Officer.

I. As far as circumstances permit, the Medical Department should arrange for attaching a hospital assistant to each large work. If no other shelter is available for the medical officer, a tent or other accommodation will be provided on application.

II. One or more hospital sheds should be erected as quickly as possible in a convenient locality, and provided with a sufficient number of mats, blankets, and ordinary medical comforts. An adequate supply of common medicines should be furnished by the Medical Department. The cost of the hospitals will be charged to the works, but indents should first be passed by the Deputy Surgeon-General, Indian Medical Department. Care should be taken to keep the hospitals dry and clean, and the requisite nursing and sanitary establishment will be supplied by the officer in charge of the work. **Hospital sheds.**

III. The medical officer will be held responsible for proper arrangements for conservancy, latrines, surface drainage, and water supply at the camps and hospitals, and he should report to the officer in charge his requirements in these respects. Drinking water should be carefully guarded from contamination. **Conservancy arrangements.**

IV. It will be the duty of the medical officer to inspect the camps every morning. No one should be allowed to live in the camps who is not upon the works. **Inspection of camps.**

V. The gangs of labourers will also be inspected daily, and the medical officer will point out any persons belonging to Classes I. and II., who in his opinion require hospital or special treatment, paying particular attention to nursing mothers, young children, and weakly adults who are not old, decrepit, or constitutionally infirm. The inspection of Class III., those under special treatment, must be done more carefully, and separate instructions regarding this will be found in Chapter IV. of this Code. **Selection of special cases.**

VI. The sanitary Inspector of the district will regularly visit D. P. W. and civil relief works, and submit a special report to the Additional Secretary, Famine Department, on each work visited.

Appendix I.

No. 5, dated Bangalore, 11th September 1877.

The Chief Commissioner, after consultation with the Famine Commissioner and the Chief Engineer, is pleased, in supersession to all former orders, to lay down the following scale of rates of wages on relief works, and of rates of food in relief camps, for the guidance of all officers in the Mysore Province.

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A.—Rates of wages on P. W. D. Relief Works.

Adult male	-	-	value of	1½	lb. of grain, plus	9	pie for condiments.	
„ female	-	-	„	1	lb. „	9	„	„
Child above 7	-	-	„	⅔	lb. „	6	„	„
Child under 7	-	-	„	¼	lb. „			

B.—Rates of Wages on Civil Relief Works.

Adult male	-	-	value of	1½	lb. of grain, plus	3	pie for condiments.	
„ female	-	-	„	1	lb. „	3	„	„
Child above 7	-	-	„	⅔	lb. „	2	„	„
Child under 7	-	-	„	¼	lb. „			

By grain is meant grain of medium quality and of the description in ordinary use at the time of payment among the labourers on the works. The price to be taken at the retail price of the grain ruling at the head-quarters of the taluk on the previous week.

C.—Rates of cooked food in relief camps for all persons, except those who are in hospital or treated as special cases as being too infirm to labour or as being children under 7 years of age—

Adult male or female	-	1 lb. of grain, plus 3 pie worth of condiments.
Child over 7 years old	-	½ lb. of grain, plus 2 „ „

N.B.—Ordinarily ragi is to be taken as the staple grain. When ragi is not procurable, rice may be given. The same quantity is to be given in either case, whether of rice or ragi flour. The ration described for food in relief camps is the quantity of raw ragi flour or rice which each person is to get; and the officer in charge of every camp will be held responsible for seeing that the ration distributed is the quantity which the one pound or the half pound will produce after baking, or boiling, as the case may be.

The sliding scale of prices attached to this Resolution shows the amount of money wage to be given, according to the varying prices of grain, on Public Works Department or civil relief works. No wages will be given and no work exacted on any relief work on Sundays. The rate of wages laid down is intended to make provision for the Sunday's food.

A. Or Higher Sliding Wage-scale for Relief Works.

Rate of Grain per Rupee.	Adult Male.			Adult Female.	Child over 7.	Child under 7.
	P. W. D. Relief Work.			P. W. D. Wage.	P. W. D. Wage.	
	Cost of 1½ lbs.	Condiment.	Daily Wage.			
14 lbs.	0 1 6	0 0 9	0 2 3	0 1 11	0 1 3	0 0 4
13½ lbs.	0 1 7	0 0 9	0 2 4	0 1 11	0 1 3	0 0 4
13 lbs.	0 1 8	0 0 9	0 2 5	0 2 0	0 1 4	0 0 4
12½ lbs.	0 1 8	0 0 9	0 2 5	0 2 0	0 1 4	0 0 4
12 lbs.	0 1 9	0 0 9	0 2 6	0 2 1	0 1 4	0 0 4
11½ lbs.	0 1 10	0 0 9	0 2 7	0 2 1	0 1 5	0 0 4
11 lbs.	0 1 11	0 0 9	0 2 8	0 2 2	0 1 5	0 0 4
10½ lbs.	0 2 0	0 0 9	0 2 9	0 2 3	0 1 6	0 0 4
10 lbs.	0 2 1	0 0 9	0 2 10	0 2 4	0 1 6	0 0 5
9½ lbs.	0 2 2	0 0 9	0 2 11	0 2 5	0 1 7	0 0 5
9 lbs.	0 2 4	0 0 9	0 3 1	0 2 6	0 1 8	0 0 5
8½ lbs.	0 2 6	0 0 9	0 3 3	0 2 8	0 1 9	0 0 6
8 lbs.	0 2 8	0 0 9	0 3 5	0 2 9	0 1 10	0 0 6
7½ lbs.	0 2 11	0 0 9	0 3 8	0 2 10	0 1 11	0 0 6
7 lbs.	0 3 1	0 0 9	0 3 10	0 3 0	0 2 0	0 0 7
6½ lbs.	0 3 3	0 0 9	0 4 0	0 3 2	0 2 1	0 0 7
6 lbs.	0 3 7	0 0 9	0 4 4	0 3 5	0 2 3	0 0 8

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B. Or Lower Sliding Wage-scale for Relief Works.

Rate of grain per Rupee.	Adult Male.			Adult Female.	Child over 7.	Child under 7.
	Civil Relief Work.			Civil wage.	Civil wage.	
	Cost of 1½ lb.	Condiments.	Daily wage.			
14 lbs.	0 1 6	0 0 3	0 1 9	0 1 5	0 0 11	0 0 4
13½ lbs.	0 1 7	0 0 3	0 1 10	0 1 5	0 0 11	0 0 4
13 lbs.	0 1 8	0 0 3	0 1 11	0 1 6	0 1 0	0 0 4
12½ lbs.	0 1 8	0 0 3	0 1 11	0 1 6	0 1 0	0 0 4
12 lbs.	0 1 9	0 0 3	0 2 0	0 1 7	0 1 0	0 0 4
11½ lbs.	0 1 10	0 0 3	0 2 1	0 1 7	0 1 1	0 0 4
11 lbs.	0 1 11	0 0 3	0 2 2	0 1 8	0 1 1	0 0 4
10½ lbs.	0 2 0	0 0 3	0 2 3	0 1 9	0 1 2	0 0 4
10 lbs.	0 2 1	0 0 3	0 2 4	0 1 10	0 1 2	0 0 5
9½ lbs.	0 2 2	0 0 3	0 2 5	0 1 11	0 1 3	0 0 5
9 lbs.	0 2 4	0 0 3	0 2 7	0 2 0	0 1 4	0 0 5
8½ lbs.	0 2 6	0 0 3	0 2 9	0 2 2	0 1 5	0 0 6
8 lbs.	0 2 8	0 0 3	0 2 11	0 2 3	0 1 6	0 0 6
7½ lbs.	0 2 11	0 0 3	0 3 2	0 2 4	0 1 7	0 0 6
7 lbs.	0 3 1	0 0 3	0 3 4	0 2 6	0 1 8	0 0 7
6½ lbs.	0 3 3	0 0 3	0 3 6	0 2 8	0 1 9	0 0 7
6 lbs.	0 3 7	0 0 3	0 3 10	0 2 11	0 1 11	0 0 8

Appendix II.

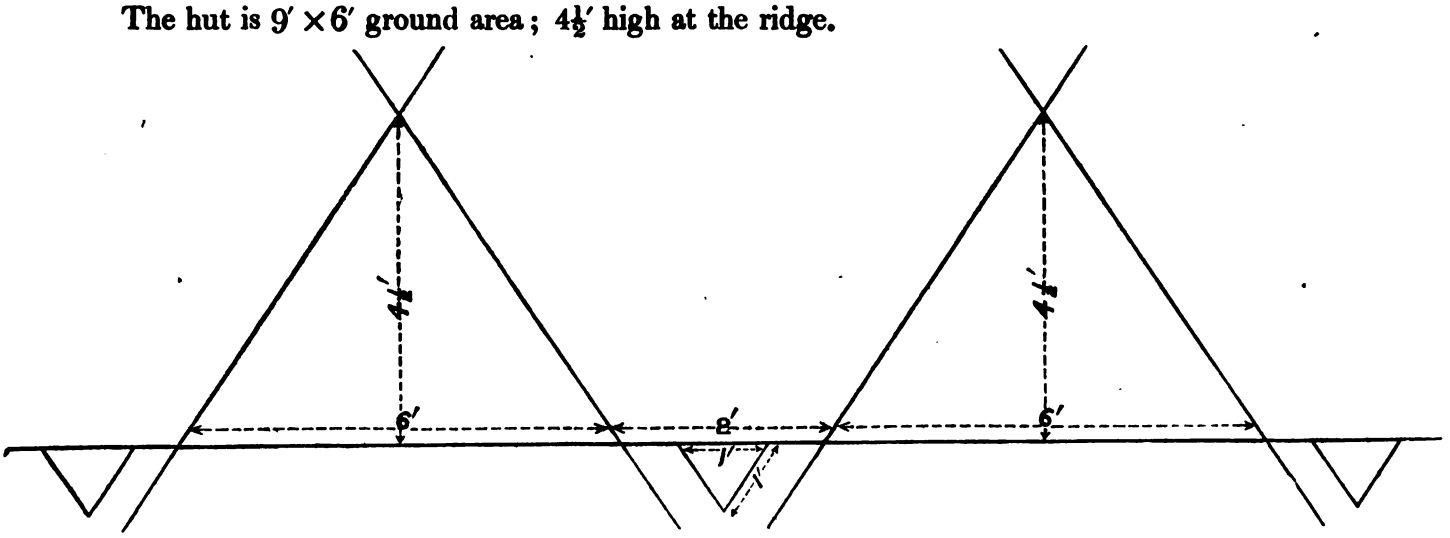
CIRCULAR 19.—For the Guidance of Officers in Charge of Poor Relief Works.

Mysore Public Works Department, Central Office,
Bangalore, 17th September 1877.

The first day's work for the poor-relief party must be hutting themselves. We do not want palatial residences such as the inhabitants never had in their own villages, nor any contractors to build huts and send in large bills. The workpeople must hut themselves; all that should be supplied being the materials that they could not readily procure.

2. The designs of these huts may vary largely. Executive engineers will probably have their own ideas about them; and within certain limits of economy, convenience, and sanitation, there is no reason why they should not follow these ideas. The following is suggested, not ordered, as a form of hut which after experience has been found to answer well.

The hut is 9′ × 6′ ground area; 4½′ high at the ridge.



Its framework consists of two pairs of light bamboos stuck into the ground 6′ apart and tied together where they cross, and a fifth bamboo used as ridge pole. The sides consist each of a bamboo matting 6′ × 5½′. A third matting of the same size is bent over the top. The upper portion then is double, the lower single matting. The latter may be tarred, or covered wattle and dab fashion with a mixture of earth and cowdung.

3. If the site of the camp is soft or cultivated soil, the flooring of the hut should be raised one foot, but if it is hard untilled land this will not be necessary; only precautions

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must be taken to keep the camp drained, and the huts dry. Each hut of this description should hold a family (say man, woman, and three children), or, if the labourers are not in families, three adults. They should be placed two feet apart, and arranged in regular streets 50 feet wide, with cross streets at intervals. Between two parallel streets there would always be two rows of huts back to back, with about 15′ to 20′ between them. Each hut should cost about Rs. 3. The camp should be of course near the work, and with people so weakened, we must give them every chance by selecting a good site for it.

4. The Executive engineer is begged to remember that our object is twofold: to get some return for the money Government does not grudge to lay out on saving human life, and also to raise a people demoralised by long pauperism and idleness, and to rally them back into the ranks of working men and women. He must not, therefore, hesitate to enter into little particulars, and to bestow accurate attention on matters that in an ordinary way would never come before him.

5. The water supply must be carefully seen to. Wherever possible it should be from above not below the camp, and wells must be sunk in convenient situations should there be no tanks or streams available for drinking purposes. Conservancy must be closely attended to. The best form for latrine is merely a long trench for each sex, dug daily one foot deep, and daily filled in, at a distance of not less than 500 feet to leeward of the camp, and well removed from the water supply. It will be very difficult to make the people use these trenches, but every effort should be made, and if necessary police stationed to enforce it.

6. Colonel Sankey's design for hospitals should be adhered to, and one or more built at every camp of above 500 people. Executive engineers must use their best judgment in selecting good sites for these. Where it is possible a medical subordinate will be attached to each large camp. Further instructions will be issued as to the special treatment of the more weakly ones who are sent to the works.

7. In anticipation of large works beginning, Executive engineers should look out for suitable head coolies fit to take charge of gangs of say 50 labourers. Over four such gangs there should be a mustering officer able to keep a nominal roll in vernacular, which is a necessary part of this system. Over every four or five of these mustering headmen there should be a sub-overseer. In beginning any new work the payments must be made daily, although, perhaps, only for the first few days. Executive engineers must see that suitable cashiers are present.

C. S. MONCRIEFF, Major R.E.,
Officiating Chief Engineer of Mysore.

Appendix III.

Rules for the Information and Guidance of those entrusted with the Sanitary Arrangements in the Famine Districts.

1. As soon as it is decided to concentrate a large body of labourers at any one place, a site for their encampment should be immediately selected. The points to be remembered in selecting a site are the following:—

Proximity to drinking water-supply;
Do. to the works where the men will be engaged;
Facilities for procuring fuel and provisions;
Do. for making field latrines;
Do. for surface drainage and provision, that the site, if epidemic disease breaks out, will not be a source of danger to villages in the neighbourhood.

2. The site must be in every case below, and not above, the source of drinking water-supply, to which it should not approach nearer than 300 yards. Elevated ground at a distance from nullahs should, if possible, be chosen. If there is a grove of trees in the neighbourhood, the encampment may be made under them. If there is only an open plain, arrangements, according to the material available, must be made to hut the people. Grass for tatties may not be procurable, but it may be possible to make open sheds with branches of trees. If no other means are at hand, cumbly tents must be rigged up, supported (if there is no wood to make uprights) by stones. One man should give his cumbly for this purpose, and his comrade should reserve his for covering both at night. These temporary habitations should be erected in straight lines, and the

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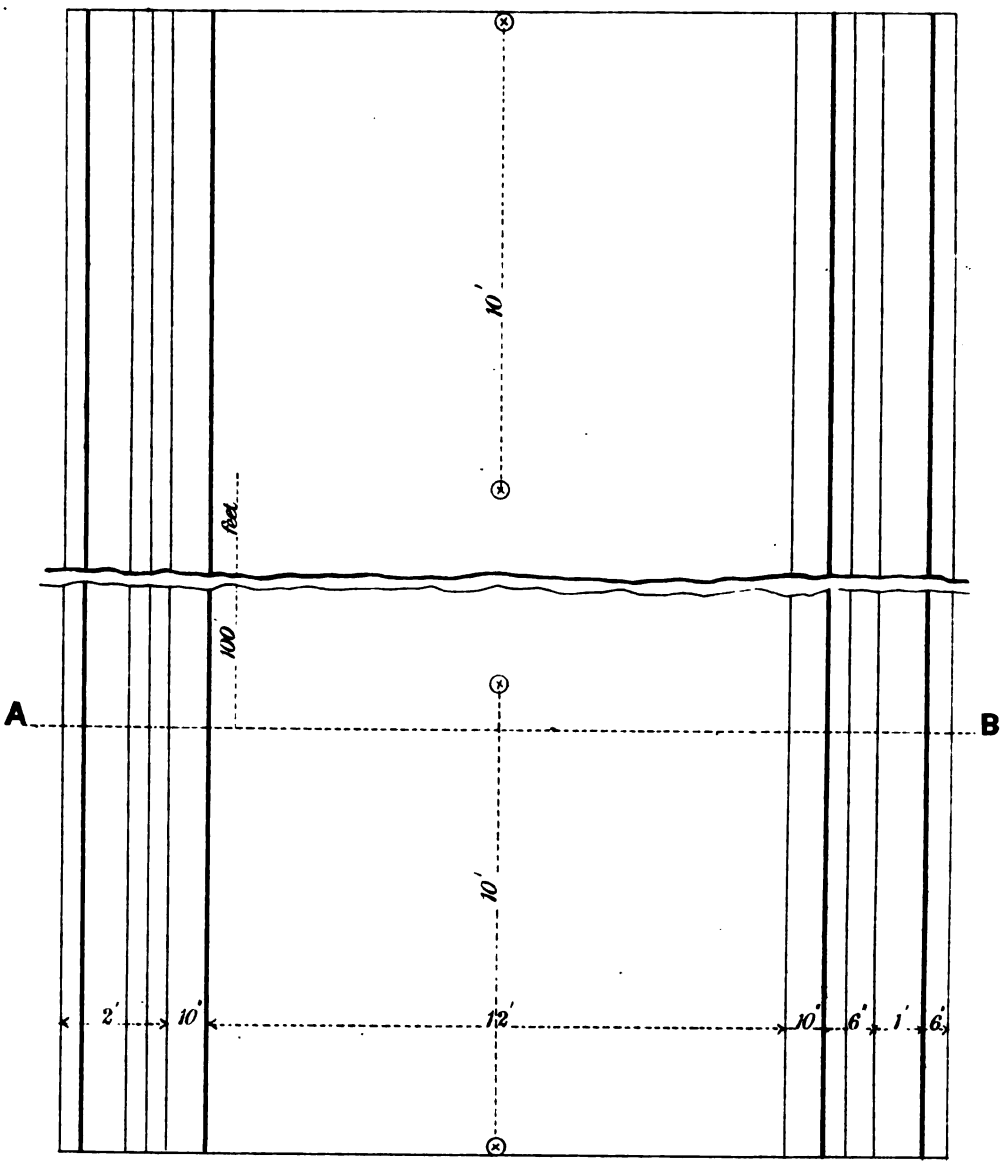
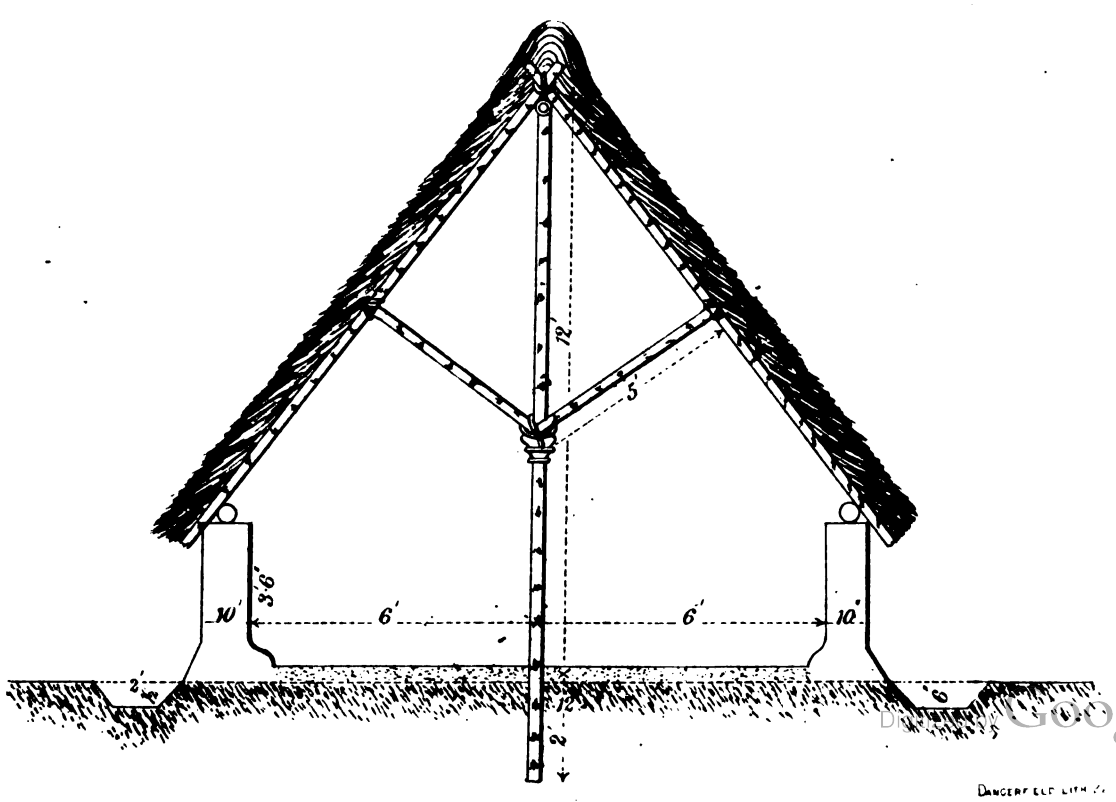
RELIEF CAMP SHED

SUITABLE FOR A HOSPITAL.

Scale 4 feet to an Inch.



Section on **A.B.**



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greatest care must be taken to prevent aggregation of too great numbers together in one spot, or in huts. There should not be more than 20 individuals in one block, and no encampment should be allowed to contain more than 500 individuals all told. If a second or a greater number of encampments are necessary they should be in the same line as each other, but separated by at least a quarter of a mile from one another.

3. The accompanying diagram shows how an encampment for 5,000 person should be laid out. In the front line there are five blocks, in each of which 20 individuals are to be located; this number of blocks should not be exceeded. Each block is separated from the next block in the same line by 50 feet, and by 100 feet from the next line, which, however, is not located exactly behind it, but the first hut in the second line is placed opposite the open space, intervening between the two huts in the front line, and so on. The huts should face north and south. There should be also two huts erected on the flanks of the lines, one for the storage of grain, the other for storage of fuel. Of course, these should be under a guard.

4. If it is possible, a raised platform about 1 foot high and consisting of stones below and well-rammed earth above, should be provided for the huts, or cumbly tents to be pitched upon. A surface-trench should be cut along the front and rear of each row. Fireplaces should not be allowed within the lines for fear of the huts catching fire, but should be placed at the head of each line to leeward, and at a distance of 100 feet, and to economise fuel the food for the occupants of each line should be cooked at one time.

5. A site at a distance from any well or water-supply, and not nearer than 300 yards, should be chosen to leeward of the lines for the latrines. Whenever the soil will admit of it, a trench more than 6 inches deep should be dug every day in a straight line. For 500 men there should be two trenches of 100 feet each. The men should be ordered after defæcation to throw some of the earth excavated from the trench into it, but a bildar must be constantly in attendance to cover the ordure with earth. Nullahs must on no account be used for latrines. If the soil is rocky and will not permit the excavation of a trench, or if there is not sufficient earth for the purpose, the people must be allowed to ease themselves in a selected spot to leeward of, and not nearer than, 400 yards to the lines. The ordure must be collected and thrown into a pit dug as deep as may be possible, and covered every day with ashes procured from the *chulas*, or from the burning of *cutchra* collected in the lines.

6. The medical subordinate's first care should be to place a guard over the drinking water-supply; to allow no person to go down into it; to allow no washing of vessels, persons, or animals near it; to see that there is an efficient drain to carry away the wastage water, which should be preserved for the use of animals, which, however, should not be allowed to approach nearer than 200 feet of well. Every effort must be made to economise the supply of water. If it runs very short, the people must be put on an allowance. "In health, an adult requires about 70 to 100 ozs. (3½ to 5 pints) " of water for nutrition, but about 20 or 30 ozs. of these are contained in the bread, " meat, &c. of the food, and the remainder is taken in some form of liquid "—(Park's Hygiene). Oxen usually drink about 5 gallons of water, but they should not be allowed to drink from the same source as the men. Great care must be taken to see that the ground all round the well is kept scrupulously clean. If there is no pavement, it can be roughly paved with loose stones if such are found in the neighbourhood. If the encampment is likely to be permanent for some months, drawing wheels with iron buckets and iron chains might with advantage be fixed round well, instead of allowing the people to use ropes.

7. The medical subordinate should get the men from one village hutted together in the lines, each of which should be named according to the village. He must make arrangements for serving out water, fuel, provisions, and, if necessary, clothing, to the occupants of each hut. It is feared that there will be a great scarcity of fuel; but gangs of labourers must be told off to collect what is obtainable, and to bring it to the hut for storage, and the medical subordinate must arrange for serving it out in allotted quantities. The greatest care must be taken to economise it. Another gang of men should be organised for the purpose of keeping every individual hut, its surroundings, and the lines clean. All surface filth must be swept up not later than by 7 a.m. and 4 p.m. every day. This work should be superintended by a peon. The latrines should be placed in the charge of the Mukadam, with a peon under him. All ordure must be covered in as soon as passed. The trenches should be made for one day in advance of what is required, but each day's ordure must be covered in before nightfall. Any person easing himself in any other than the allotted place should be summarily dealt with and punished.

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8. A burial ground must be selected at least half a mile to leeward of the lines, and care must be taken to see that there is sufficient soil to bury bodies at a depth of 6 feet.

9. Every morning the medical subordinate should go round himself and inspect the encampments, and find out if any person had been taken ill during the night, and arrangements should be made to give medicine at once.

10. The medical subordinate should live as near as possible in the centre of his encampments for facility of administration, and near his habitation should be erected the hospital, which should be calculated to afford accommodation for at least 7 per cent. of strength.

11. He should indent for chlorodyne, cholera mixture with and without opium; for hospital comforts, *extractum carnis*, which may be required in large quantities; for a large supply of disinfectants, besides other drugs and surgical appliances. He should also have a large supply of clothing.

12. Should epidemic disease, such as cholera, break out, the patients should be treated, not in the general hospital, but in a temporary hospital built to leeward of the lines in which the sick man is, but at a distance from the latrines. The bodies of patients who have died from cholera must be buried speedily in the clothes in which they have died, and the earth from the place where the patient was ill should be dug up and sprinkled with disinfecting powder and buried. If more than three cases occur in the encampment, it must be abandoned, and the people who live in it must march at right angles to the wind to a fresh encampment, which must be prepared for them to leeward of the other encampments. They should, if possible, be put to work in another place at some distance from which the other labourers either work or are encamped.

13. The hospital subordinate should arrange a place on one of the flanks of the encampments for all the carts that may bring in grain, &c. The carts should be ranged in rows, and the bullocks tethered in lines. Similar arrangements regarding water-supply, fuel, fodder, and latrines will be required for the cartmen and animals.

14. If there are any animals to be slaughtered, a place should be selected half a mile to the leeward of the encampment, and care should be taken to bury the offal, blood, and bones.

(Signed) T. G. HEWLETT,
Acting Sanitary Commissioner.

Appendix IV.

Division Sub-division or Range Labour Report for the Week ending Saturday the of .

Taluk.	Name of Work.	No. employed last week.	Average Number employed this week.					Price of Staple Grain.	Rate of Wages.	Expenditure during week.	Total Expenditure to date.	State of Weather.	State of Health.	General Remarks.
			Men.	Women.	Children.		Total.							
					Over 7.	Under 7.								

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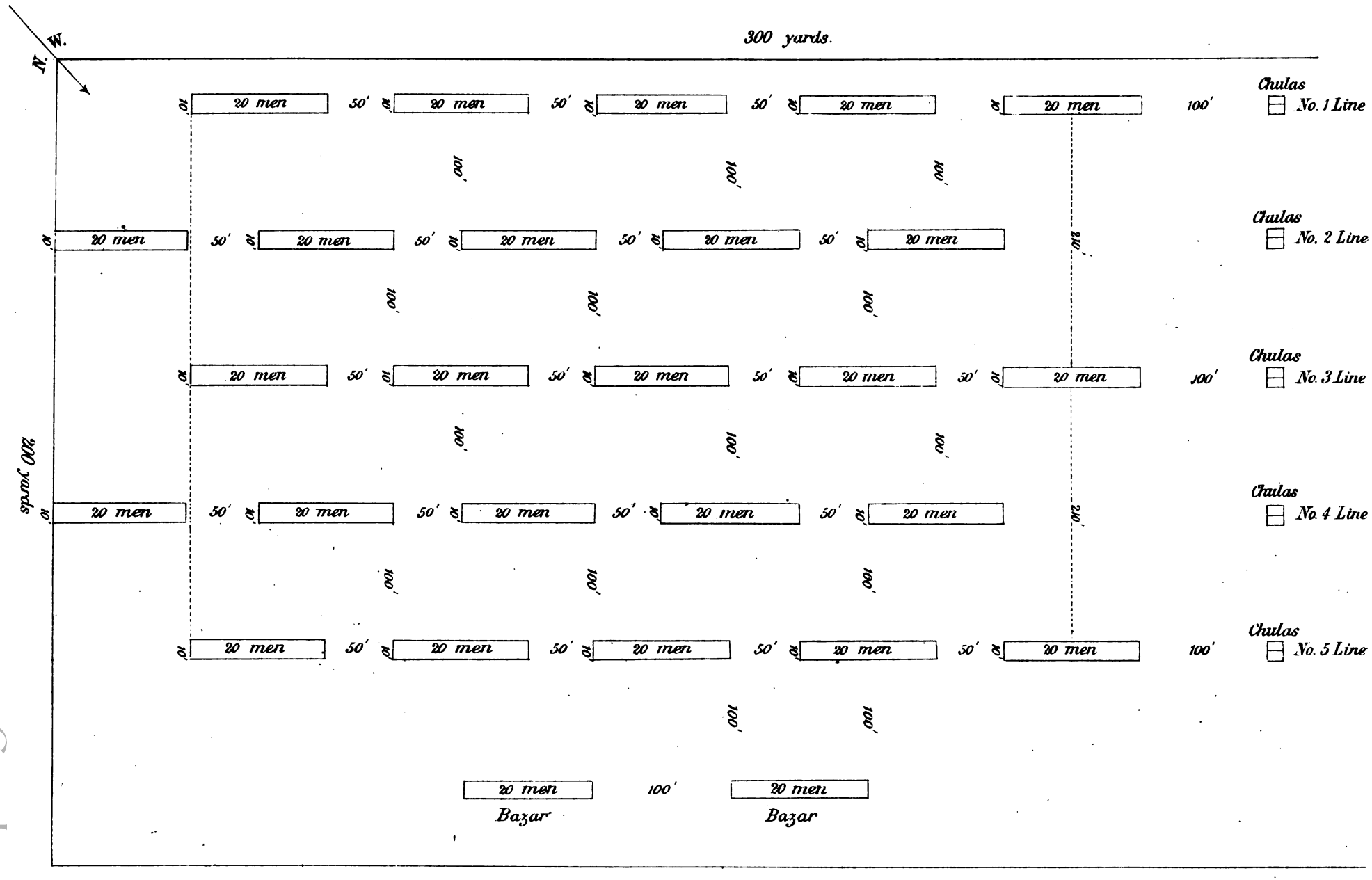

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Dancerfield Lith 22 Bedford St Covent Garden

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CHAPTER II.

Civil Relief Works.

When civil relief works are to be used.

I. Civil relief works are intended to be used under three circumstances—

(1.) When the applicants for labour are numerous, and there is no relief works under the public works department available for sending them to.

(2.) When the relief work is a long way off and the applicants are unaccustomed to labour, it may be advisable then to employ them for a time on a civil relief work not too far from home, and when they are organized into gangs and accustomed to the system of work, then to march them off to the larger relief work.

(3.) As a means of giving light out-of-door work to the old and decrepit and those who are too infirm to be included in Class 2 and sent to the Public Works Department.

Standard for civil relief works.

II. No work is suitable to be used as a civil relief work unless it will employ 300 people for at least a month; each project of this class must receive separate sanction, a brief report of its character and estimate of its cost being sent up by the Deputy Commissioner; and special sanction must be given before work is begun upon it. But on any emergency or sudden rush of labour, Deputy Commissioners have authority to open works of this kind which have been previously sanctioned, reporting the same at once to the Additional Secretary, Famine Department.

Supervision.

III. Each work of this class must be placed under a responsible and well paid civil officer holding a permanent appointment, and not lower in rank than an inspector of police or peshkar, who will reside permanently on the spot and will be personally responsible for seeing that the labourers are properly treated and paid and tasked as far as their strength goes.

Organization.

IV. The rules laid down for the organization of a P. W. D. relief work apply generally to the organization of a civil relief work. There should be one register-keeper or mutsaddi over the work, who should keep a nominal roll of the labourers and take the daily attendance. They should be divided into gangs of about 40 or 50 under one head cooly (an office which may with advantage be given to a Brahman or Lingayat or other high-caste man in distress). They should be hutted on the work, and the huts and camps be of the pattern directed by the chief engineer. Their rate of pay will be the lower or B scale, and will be paid them as a rule twice a week, unless it is found necessary to pay three times a week or even daily. The civil officer will see that there is a sufficient bazar for them to procure supplies at, and will be responsible generally for their condition as in Chapter I. No medical officer will ordinarily be attached to a civil relief work. But the sanitary inspector will visit the work, and any who fall sick will be sent in to the nearest hospital, which will generally be the one attached to the Taluk relief camp. Task work to the amount of at least 50 per cent of an ordinary task will be exacted from all able-bodied labourers who may be sent to the relief work under the circumstances described in para. I. clauses (1) and (2), and the condiment portion of their wage may if, necessary, be cut as a punishment; but this must be done with great caution and after much patience, and should at once be reported by the officer in charge to his superior relief officer. From the old and decrepit labourers described in para I., clause (3), no task can be exacted.

Inspection by superior officers.

V. The amildar of the taluk will visit the relief work at least once a week; and the superior relief officer in charge of the sub-division should visit it as often as possible and at unexpected times, should count the men on the works and compare them with the nominal register, should see them paid, and inquire if they have any complaints; and both these officials should record the results of inspection in their diaries.

Special treatment.

VI. The rules for special treatment are applicable in their entirety to civil relief works.

Weekly returns.

VII. The officer in charge of the relief work will draw up every Sunday a statement (Appendix No. V.) for the week ending the preceding Saturday, showing the number of persons and the expenditure on the work, and will forward it in duplicate to the amildar, who will send one copy to the Additional Secretary, Famine Department, direct, and one copy to his district or sub-division officer.

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Appendix V.

Report on Civil Relief Works for the Taluk of for the Week ending Saturday the of 1877.

Name of work.	Total Amount sanctioned for Work.	Amount expended to date of last report.	Total Number of Labourers employed during week.			Rate of Daily Payment.	Price of Grain on which Wage is calculated.	Total Expenditure on Labour.	Establishment on work.			Materials bought and employed.		Number of children under 7.	Number of women taking care of them.	Expenditure on children and women in columns 15 and 16.	Total expenditure during the week.	Name of Officer in direct local charge.	Remarks.
			Men.	Women.	Children above 7.				Nature of Office.	Rate of Pay.	Cost.	Description of Materials.	Cost.						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
						A P Men Women Children			Writers Accountants, &c.										

N.B.—In columns 4, 5, 6, 15, 16, the gross total numbers for the 6 days are to be given; the averages will be struck in the Secretariat Office.

CHAPTER III.

Relief Camps.

I. The relief camp is intended to provide temporarily for those who are able to work; and permanently (that is as long as they require it) for those who are sick and unable to do any considerable amount of work through old age and infirmity.

Temporary population.

II. The temporary cases are those where applicants come for labour, and the relief officer is not able at the time to provide them with labour; he must not turn them away, but must relieve them in the camp and work them there till he can draft them on to a relief work. The relief camp may also be used as a rest-house for gangs on their way to a relief work, who come with an order from the relief officer entitling them to food and shelter for the night. There is further the case of the emigrants' rest-houses which will be treated separately.

Resident population.

III. The permanent cases are those who are not so decrepit and bedridden as to require village relief; but who are not fit to be sent on to a relief work, or to look after themselves and cook for themselves. They are the least efficient portion of those who are not fit to be put into Class II. They include those who are in bad health, but not ill enough to be put into hospital, and those who are convalescents, and have just left hospital.

The ration of food.

IV. Nothing but cooked food is given at relief camps, the ration being 1 lb. of rice or of ragi flour plus 3 pie worth of condiments for an adult, and half the quantity for a child over 7 plus 2 pies. The chapter on Special Treatment applies equally to special cases in relief camps. No raw rations are permitted. The daily food is given in two meals, morning and evening, at about 7 a.m. and 5 p.m.

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V. The two conditions on which food is given at a relief camp are residence and work. For this reason the camp must be enclosed, and admission or exit only be possible by a gate at which a guard is constantly posted. Sufficient accommodation must be provided inside for the usual population of the camp, with a margin over for any exceptional influx. Every person in the camp must be put to some work however slight, except those who are actually sick. The feeblest old woman can spin a little thread, and others can carry a light basket of sand to throw on the floor, or card cotton, or pick wool, and those who are a little stronger can collect and break stones. For the sake of their own health and spirits and self respect, it is better they should do this than that they should sit idle all day. Conditions of relief.

VI. The establishment should consist of paupers as far as possible. The only paid officials should be the superintendent, the accountant, and the hospital assistant; but 1 rupee per month may be paid to the overseers and to the head cook in addition to food. Carpenters and blacksmiths if required may be called in and paid in cash; but all other servants of the camp should be paid in food, or in raw grain if their caste requires it, and should, as far as possible, be appointed from among the paupers themselves, not from outside. Established.

VII. The duty of the superintendent is general supervision. He is responsible for examining the supply of grain received from the contractor, testing its quantity and quality, and entering it in the stock register; also for seeing that it is securely kept in a safe chamber under a good lock or sufficient guard. He is bound to be always present at feeding time, to see that the food is well cooked and the amount of it correct; to see that the paupers are properly oragnized into gangs and parties, are set to work at labour suitable to their capacities and do a sufficient quantity of the work; and that all members of the establishment do their duty punctually and thoroughly. He will muster the establishment every day and record their attendance in a register, the form of which will be found at the end of this Chapter. He will also receive daily from the taluk relief officer all new admissions, will assort them into gangs, and see that their names are entered by the overseer on his muster roll. The superintendent.

VIII. The accountant must always be a member of the amildar's permanent establishment, and must be selected for this work because of his special qualifications, a temporary officiating man filling his place. He has to keep up the returns and registers, the forms of which are given in the Appendix at the end of this Chapter. They consist of— The accountant.

(1.) The stock register of rice, &c. detailed.
(2.) The daily register of paupers fed in the relief camp.
(3.) The daily abstract statement of paupers fed in the relief camp.
(4.) The pay register of establishment.
(5.) The cash book and register of contingent expenditure.

The manner in which each of these statements is be prepared is explained in a note at the foot of the statement.

IX. The overseer will keep the nominal register (the form of which is given at the end of this Chapter) of the paupers in the camp. If there are more than four hundred a second overseer may be appointed. He should ordinarily be a respectable literate inhabitant of the taluk, Muhammadan or Brahman or of other good caste, who is in distressed circumstance and is glad to do the work for a payment of one rupee, plus half as much again as the daily ration, which may be given raw. He will marshal the people in the morning to the early meal, and will take the roll call while it is being eaten. When it is taken he will write out a slip in the following form and make it over to the accountant. The Overseer.

Attendance morning of the of .

Name of gangman.	Men.	Women.	Children.	Total.	Total No. of lbs. of grain.

During the day he will supervise the work of the gangs, either generally or any particular set of gangs, as the superintendent may direct. In the evening he will again marshal the people to the evening meal, and take the roll call and give a slip to the accountant in the same form as in the morning.

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Organization of gangs.

X. The gangs are to be organised according to their capacity for work, and also, where necessary, according to their caste, provided they are not thereby split up into too small numbers. If the numbers are small, persons of good caste can be allowed to sit a little apart in working and eating from the other members of the gang, and can have a portion of the shed walled off for them, while still continuing to be numbered in the gang. The number of a gang should usually be about 40 or 50; when the work is sedentary, like spinning or stonebreaking, it may be more; when the labourers are scattered over a large space, as on stone collecting, it should be less. The gangsman or head cooly should ordinarily be a respectable illiterate resident of the taluk in distressed circumstances, who is glad to accept the post for the wages of a ration half as large again as the ordinary one, *i.e.*, 1½ lbs. of grain, which may be given raw. The organization of the gangs should be kept as uniform as possible, so that people may know their work and their place and each other; they should sleep in the same shed, eat meals in the same place, and after meals go together to the same work in the same place, as nearly as possible.

Menial establishment.

XI. This establishment, which consists of cooks, water-carriers, rice-cleaners or grinders, guards, and sweepers, should be kept down to a moderate strength, and should, as far as possible, be recruited from the paupers of the kitchen, or from respectable people of the taluk who are in distressed circumstances. As a rule they should be paid in grain, which may be given raw if desired, at the rate of 1½ lbs., or for the most onerous task 2 lbs. a day; but where the numbers are large the head cook may in addition receive Re. 1 per mensem. The number of each class of servants should be arranged on a sliding scale in proportion to the number of paupers to be attended to. The number of cooks should probably be about 1 per cent., but more may be required where rice is cooked than where ragi; and where the resident population is very feeble more persons must be entertained to carry and distribute the cooked food than where there are able-bodied paupers who can be so employed. The number of water-women and of sweepers should be about the same as the cooks. But for the sick in hospital probably one sweeper will be required for 25 patients. The occupation of rice-cleaning or ragi-grinding is one that can be suitably given to women of respectable castes; two women in good health should easily grind 30 seers of ragi a day, or enough for 60 adults; but if they are enfeebled, then two relays of two women each should be allowed for each mill. It is not intended in these rules to tie officers down to a too rigid uniformity, but every superintendent and taluk relief officer is expected to do all in his power to combine efficiency with economy.

Orphans.

XII. The orphans and children deserted by their parents should be formed into a separate gang (or, if necessary, two gangs of boys and girls separately) and clothed in a distinct uniform. As soon as preparations can be made to receive them they should all be sent in to the relief camp at the district head-quarters and not kept in outlying camps. The disposal of these orphans is in the hands of government, and no officer is entitled to make any of them over to any society or private person without the special sanction of the Famine Commissioner.

Reception of applicants for relief.

XIII. In front of and near the door of each relief camp an enclosure shall be railed off in which all fresh applicants for relief shall be received, whether they present themselves voluntarily, or are sent in by the circle inspectors or other relief officers. In this place some superior relief officer shall attend at a fixed hour every day, either the special relief officer of the taluk, or the village relief officer, or the amildar, or in the absence of all of these the peshkar, to receive the applicants and either forward them to a relief work or admit them into the relief camp.

The medical officer.

XIV. There shall be a medical officer attached to each relief camp. He will be responsible for seeing that all the requirements of a hospital are provided, and that the sheds are dry and ventilated. He will send in to the superintendent a daily return showing the number of sick in hospital, the daily admissions, discharges, and deaths. He will constantly go round and inspect the residents in the camp, and carry out in regard to these all the instructions contained in the chapter on special treatment.

Travellers' rest-houses.

XV. On certain roads along which emigrants travel to and from the coffee districts it is considered necessary still to keep up places at which they can be fed. At these places the conditions of residence and work will not be insisted on. Two meals will be cooked a day, morning and evening; those who arrive in the evening will receive a meal, and shelter in a shed for the night, and will be sent on next day after receiving a second meal in the morning. The superintendent is responsible for seeing that they eat the meal in his presence and do not carry it away, and that this indulgence

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is granted only to *bonâ fide* travellers who are in want. The taluk relief officer will pay a special attention to the dining-places; will endeavour to dissuade feeble and emaciated persons from emigrating, and offer them employment on a relief work; and if the number becomes at all considerable, he will report the facts to the Deputy Commissioner of the district. The superintendent will add to his daily abstract register a note showing number of people going to the coffee districts and number of people returning from the coffee districts.

XVI. An inspection book will be kept up at each relief camp, in which inspecting officers will record remarks and orders. Inspection book.

Superintendent's Statement.—I. Attendance Roll of Establishment.

No.	Name of Official.	Office.	Attendance. 1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	11th.	12th.	13th.	14th.	15th.	16th.	17th.	18th.	19th.	20th.	21st.	22nd.	23rd.	24th.	25th.	26th.	27th.	28th.	29th.	30th.	31st.

Accountant's Statement I. Stock Register. Relief Camp.

Date.	——	Bagi.	Rice.	Dál.	Salt.	Tamarind.	Chillies.	Coriander.	Turmeric.	Garlic.	Pepper.	Cummin seed.	Mustard.	Ghee.	Onions.	Vegetables.	Wood.	Signature of Superintendent.
	Balance in hand - -																	
	Issued - - -																	Enter here to whom issued.
	Balance in Store - -																	
	Received from Contractor																	Enter here fromwhom received.
	Total in Store - -																	

The Accountant will each day in the evening enter the quantity in lbs. of each article issued and received, and the balance in store at the end of the day. The issues and receipts will be attested by the signature of the Superintendent.

Accountant's Statement II.—Detailed Daily Return of Paupers fed in Relief Camp.

Date.	Name of Gangsman.	Nature and Employment of Gang.	Adults. M.		Children.	Total.	Total Number of lbs. of food.	

One page to be given to each day.
This statement gives the details by gangs, and at the bottom the total should be struck.

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Accountant's Statement III.—Daily Abstract Return of Paupers fed in

Date.	Adults.		Children.	Total.	Total Number of lbs. of food.	
	M.	F.				

One line for each day. The figures will correspond with the daily total of Statement II.

Accountant's Statement IV.—Pay Register of Establishment.

No.	Name.	Office.	Rate of Pay.	No. of Days employed in Month.	Amount.	Total.	

This will be made out on the 1st of every month. It will contain only the names of those who receive cash wages.

Accountant's Statement V.—Cash Book of Receipts and Contingent Expenditure.

Date.	Particulars.	Amount received.	Amount disbursed.	Total.	From whom received and by whose order expended.	

All unusual expenditure will be entered here as well as all receipts from the sale of any manufactured article, &c.

Overseer's Nominal Roll.

Name of Gangsman.	Name of Labourer, with father's or husband's name.	Residence.	Caste.	Attendance.														
				1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	11th.	12th.	13th.	14th.	15th.

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Overseer's Nominal Roll.

Name of Gangsman.	Name of Labourer, with father's or husband's name.	Residence.	Caste.	Attendance.														
				16th.	17th.	18th.	19th.	20th.	21st.	22nd.	23rd.	24th.	25th.	26th.	27th.	28th.	29th.	30th.	31st.

CHAPTER IV.

Special treatment ordinarily the duty of the civil relief officer.

I. The selecting from the ordinary labourers, and the setting apart of those who are reduced by prolonged innutrition, is a most important part of the relief system. The duty of making the selection belongs (Chap. I., sec. II.) to the civil relief officer, or, in his default, to the P. W. D. officer. But either officer in performing the task should act in concert with and under the advice of the medical officer, whose part it is to indicate what treatment he considers necessary.

Classification of cases.

II. The following are the principal classes into which the cases under special treatment may be divided:—

(*a.*) Nursing mothers who are themselves weak, or who have weakly or very young babies, may get the higher rate of pay (scale A) and light work.

(*b.*) Thin babies may, in addition to their usual nourishment, be supplied with milk once or twice a day.

(*c.*) Young children, *i.e.*, those under 12 years of age, who are emaciated may—

(1.) be fed instead of being paid. They will, in this case, become out-patients of the hospital.

(2.) get a morning meal of rice and milk, or conjee, in addition to the lower wage (scale B).

(3.) for a few days be treated in any manner the officer in charge, in the exercise of a wise and cautious discretion, deems proper.

The practical difficulty in dealing with young children is that their parents sometimes neglect them, or deprive them of the food given them; hence the rule is necessary that all food given to children should be eaten in the presence of the relief officer.

The women placed in charge of the young children belonging to the special treatment class must be very carefully chosen, and the relief officer must see that they wash the children in warm or cold water, as may be most suitable, and attend closely to their feeding, comfort, and cleanliness.

(*d.*) Young and middle-aged adults, reduced or emaciated by want, may get the higher wage (scale A), and be put to nominal work for a week or so till they gain strength. As a rule, further treatment is unnecessary; if it is necessary, then the patient is probably a fit subject for the hospital.

(*e.*) Any further treatment required is provided for by the discretionary grant allowed the officer in charge of the work. All wages paid to the special treatment class should be paid daily, or three times a week.

Fortnightly Report on Special Treatment.

Name of work.	Fortnight ending Saturday, the	No. under Special Treatment.		Children.	
		Men.	Women.	Over 7.	Under 7.
1	2	3	4	5	6

Cost of Special Treatment.

Paid in wages (Cash).	Cost of food.	Total.	Remarks.
7	8	9	10

General remarks.

III. The amount of special treatment and its results should be reported upon fortnightly, in the form shown in the margin, by the officer who is responsible for the special treatment to his immediate superior, who will submit the report with his opinion to the Famine Commissioner or the Chief Engineer, as the case may be. As a rule, the Government rates of pay with light work will meet all ordinary cases of distress. But it is impossible to lay down rules for every case, and much of the success of the treatment will depend upon constant and careful selection, and upon the humane exertions of the officer in charge. On the one hand, no effort is to be wanting to relieve distress and check mortality; on the other, unnecessary indulgence should be avoided, and a due economy observed.

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IV. When a hospital assistant cannot be sent to take charge of a relief work or relief camp, the duties above described must necessarily devolve upon the officer in charge of the work or camp.

CHAPTER V.

Village Inspection.

Objects of village inspection.

I. The object of a system of frequently repeated house-to-house visitation in each village is to make sure that the measures taken by Government for the relief of the famine-stricken are effectual; that the tests enforced to prevent persons not in actual need of relief getting admittance to Government works or relief camps do not produce hardship; that none are allowed to die through neglect or ignorance of the means of help; and that any indications of distress among the general population are immediately brought to notice and checked. The organization and efficiency of the village relief system will accordingly form the principal duty of all district officers, and their activity in this respect will be closely watched. They should be constantly on the move, and in their weekly progress reports give briefly the result of their experience.

Procedure in towns.

A similar system of house-to-house inspection should be adopted in all large towns. A copy of the order introducing the system in Bangalore is appended, and may serve as a guide to the proper procedure in other towns.

Village inspection by whom performed.

II. In the first instance it will be the duty of the village officers to ascertain and register the distressed poor of their respective villages; their work will be checked and supervised by specially appointed inspectors, and the inspectors in their turn will be controlled by special relief officers under the Deputy Commissioner. Where necessary village relief officers may be appointed either instead of or to assist the special relief officer. The village relief officer should be a native gentleman of a superior stamp and of active habits, holding a permanent appointment under Government, a temporary substitute being employed in his place. Assistant Commissioners may, in addition to their own duties, be made special relief officers of the whole or part of their charge.

Division of the taluks into circles, and appointment of circle inspectors.

III. The Deputy Commissioner of each district will at once divide those taluks of his district which are severely distressed into circles containing about 30 villages each. Over each circle an inspector should be appointed, to be called the circle inspector, who should visit each village once a week, or at least once in 10 days. To fill these posts of circle inspectors only officers who hold permanent appointments may be selected; as a rule the more active and intelligent of the Shekdars, and of the Gumastas of the Amildars or of Deputy Commissioners' courts, should be appointed, or officials of that description, and temporary men on Rs. 10 per mensem, should fill their places. Ten per cent. of the circle inspectors' work must be tested weekly by the special relief officer of the taluk, or, if there is none, by the village relief officer of the taluk.

District.	No. of severely distressed taluks.
Bangalore - -	9
Kolar - - -	10
Túmkúr - -	8
Chitaldroog - -	8
Shimoga - -	2
Kadur - -	3
Hassan - -	7
Mysore - -	2

All civil relief officers in charge of a taluk (whether Deputy Commissioner, Assistant Commissioners, or special relief officers) will enter in their weekly diaries the result of their own inspections and supervision.

Treatment of persons in distress unable to leave the village.

IV. Every village officer (Patel and Shanbhog) should be again warned that he will be held strictly responsible that his village is free from persons in severe distress. The Patel, assisted by the Shanbhog, of each village must keep up a register as under of those whom the circle inspector selects as requiring relief in the village.

A. Register of Persons unable to leave the Village of , and in need of Relief.

Number.	Name of person.	Age.	Sex.	Cause of incapacity to leave the Village.	Signature of Village Officer.	Amount of grain to be given.	Remarks of Circle Inspector, and date of first entry of name.	Remarks of other Inspecting Officers.

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In this Register (A) no one must be entered who is capable of doing any kind of labour on a relief work or in a relief camp, only the bedridden, the cripples, the very infirm, blind, and such cases should be on this register, which entitles these to receive relief at their home, and then only provided that they have no other means of support and no able-bodied relatives in a position to assist them. To such, 1 lb. of raw grain may be given daily to an adult; ½ lb. to a child above 12; and ¼ lb. to a young child. The food should usually be given in the presence of the circle inspector, the village officers, and two respectable inhabitants, and the quantity given on each occasion should therefore be sufficient to last the recipients till the next visit of the inspector. A separate Register (B) for such persons should be kept by the Shanbhog in the form given in the margin (*below*), and each entry in this should be signed by the parties witnessing the distribution. To meet this small expenditure a petty advance of money, not exceeding a month's salary, may be allowed the circle inspector. The superior relief officers on visiting a village will invariably examine the people registered and sign the Registers A and B.

Village Register B.

Name of Recipient.	No. in Register A.	Amount of Daily Ration to which entitled.	Amount given by Circle Inspector.	Date.	Witnesses.

Treatment of persons in distress able to leave the village.

V. The village Patel, with the help of the Shanbhog, should also compile a list of those very poor persons who are able to leave the village, but who have not done so. To people on this list food will not be allowed in the village, but the circle inspector will give them a ticket to present to the place fixed for applicants at the Taluk Head-quarter Relief Camp, whence they will be sent either to a relief work or to a relief camp. The circle inspector must not allow them to remain in the village. If it is a day's journey to the taluk head-quarters, the circle inspector will give them either grain or money to buy one day's food, entering the disbursement in column 6 of Register C, and procuring the signatures of two witnesses to the transaction. Ordinary able-bodied labourers will not be entered in this list, which is intended to show that the village officer is aware of any cases of special poverty in his village. At every succeeding inspection the circle inspector will inquire whether any of the people entered on this list who were sent away have returned, and whether there are any others in the village who ought to be entered on it and sent to a relief work or relief camp accordingly.

Village Register C.

Date.	Number.	Name.	Age.	Sex.	Remarks showing date on which they are sent to the Taluk Relief Officer, and whether absent or present in the Village on subsequent Inspections.
1	2	3	4	5	6

Columns 1 to 5 will be filled up by the Shanbhog. Column 6 by the circle inspector on his visits.

Deaths.

VI. The death of any person on Register (A) must be reported by the circle inspector to the special relief officer, who will enter the total number in his weekly report.

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Deaths. Duties of circle inspectors.

VII. The first duty of the circle inspector or of an inspecting officer visiting a village is to go carefully through the village house by house, the inspection being made more searching in the poorer quarters and among the lower and Pariah castes. Cases of people of good position in ascertained distress, such as of pardah or high caste women, and any suffering among particular classes, should be specially reported upon to the special relief officer of the taluk. The able-bodied asking for assistance, or who appear in need of relief, should be directed to the public works, and sent with a letter to the head-quarters of the taluk for an order admitting to the works. The results of the inspection should be compared with the Registers (A), (B), (C), and if necessary the registers should be corrected by striking off names improperly entered or adding those omitted. The inspector lastly should satisfy himself that all on Register (A) really in need of relief get relief, and that none on Register (C) are allowed to return and starve quietly in the village.

Professional beggars, &c.

VIII. Professional beggars well able to earn their living, religious mendicants, and the like are not to be relieved; nor are people able to help themselves to be needlessly interfered with.

Wanderers and pauper travellers.

IX. If, when travelling, a pauper or distressed wanderer is met, the circle inspector will take him to the nearest village or have him carried there. Wanderers so brought or arriving in any other way will be fed once by the village officer in the presence of two respectable villagers, and then forwarded to the nearest relief camp under proper escort, with a report, signed also by the two villagers, giving the circumstances of the case.

Registers to be kept by circle inspectors.

X. The circle inspector must keep up two statements of expenditure, the one corresponding to Register A, and showing the number relieved in grain in each village, and in accordance with this statement he will be enabled to draw weekly on the amildar's treasury for the weekly value of grain to be distributed; the other showing particulars of the casual expenditure, advances to paupers on Register C, to wanderers, &c.

Circle Inspector's Register I.

Village.	Number of People on Village Register A.	Quantity of daily grain to which they are entitled.	Quantity distributed by Inspector during week.	Value of grain.

Circle Inspector's Register II.

Date.	Particulars of Expenditure.	Total.

Advance to village officers.

XI. To provide for wanderers Deputy Commissioners are authorised to deposit a sum, not exceeding Rs. 5, with the village officers of any village where circumstances call for the grant. As the money is spent bills should be drawn on the Amildar, after two respectable inhabitants have countersigned the vouchers.

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APPENDIX.

Famine. No. 66.

To the PRESIDENT, Municipal Commission, Bangalore.

Mysore, Chief Commissioner's Office,
Bangalore, 26th September 1877.

I am desired by the Chief Commissioner to say that, after consultation with the Famine Commissioner, he has decided that the following arrangements should be made for the relief of distress in the town of Bangalore.

2. Under the orders of the Government of India, all open kitchens, at which paupers receive food which they can take away uneaten, or which they can eat and depart, must be abolished. The pettah kitchen has therefore to be closed as soon as possible, and it remains to make proper arrangements for the people who have hitherto been fed at this place.

3. Those people consist of four classes: First, paupers who have crowded in from the village and from other districts; of these the able-bodied will be removed to relief works, and the infirm and sick alone retained in the hospitals and in the Siledar lines. Secondly, the townspeople; these are (1) sick, (2) able-bodied and accustomed to labour, (3) able-bodied, but unaccustomed to manual labour and earthwork, only to some trade such as weaving, tailoring, working in leather, &c., (4) infirm and unable through old age or bodily weakness to earn their bread. The two former classes will be provided for at the hospitals and on the relief works; the two latter should be cared for by the Municipal Committee in the manner I am now to describe.

4. The town and cantonment should be divided by you into portions, the size of which must be regulated by the number of houses inhabited by members of the two classes referred to; as a rule, there should not be more than 100 of such houses in each beat or portion. These beats should then be put under the charge of some one gentleman who will undertake to perform the duty required of him, and who will be called the inspector of the beat. His duty is to make a house-to-house visitation of his beat to ascertain what persons in the beat are either infirm (Class 4) or fit for other than manual labour (Class 3), and to prepare a register of them. He will give to each person who is too infirm to labour in any way, and yet not sick so as to be a fit case for hospital, a ticket with a number on it (corresponding to the number in his register), which shall entitle that person to receive 1 lb. of rice a day from a grain-merchant in the neighbourhood, who is to be fixed on by the inspector of the beat with your concurrence. He should make out a separate register of such grain recipients in the form annexed, and will revise it every week, and every Monday he should give an order on the grain merchant showing how many lbs. of rice he is entitled to supply every day. The distribution of rice to ticket-holders should take place at a fixed time every morning. Either the inspector or some municipal officer should, if possible, be present at the distribution to see that there is no fraud, and that the infirm persons receive their dole in an orderly and seemly way.

5. The inspectors of beats will be expected to visit their beats weekly, and the tickets for grain must be renewed every week by them; or the grain-merchant will not be authorised to serve out the grain to the ticket-holders.

6. To those persons who belong to some trade and are unable through poverty to carry on their trade, the means of doing so should be given; cotton should be supplied for women to spin, yarn or wool for weavers to weave, leather for shoemakers, and so on, exacting from each of them the return of a due quantity of the manufactured article at the end of the week, which Government will buy from them at a fixed remunerative price. It seems best that this, which is a technical and difficult task, should be performed by a special official, to be called the distributor of work; one such official will probably be sufficient for the pettah and one for the cantonment. The inspectors of beats will send to the distributor of work every Monday all persons belonging to the classes above described, who are not accustomed to manual labour; giving to each a slip showing number of beat, number of house on inspector's register, and name of ticket-holder; but care must be taken to discriminate; the weavers, for instance, who have been working on the Sampangi tank have now become good labourers and should not be set to loom work again, which is much more difficult to supervise. If a volunteer can be procured for this office so much the better; if not, a paid official may be appointed. It is impossible to specify beforehand what the details of the transaction which the distributor of work will have to supervise should be; what quantity should be exacted of any kind of work; at what price it should be paid for; or how Government should dispose of it. Experience will soon provide a set of rules on these points; and,

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in all probability, the Charitable Committee will be able to take the cloth woven or the shoes made, &c. off your hands, and to distribute them to orphans and to other fit objects of charity.

7. The Chief Commissioner confidently hopes that every member of the Municipal Committee will be willing to take a beat and to carry out this house-to-house inspection. In case there should be more beats than committee members you should enlist the services of volunteers, applying first to the members of the Charitable Relief Committee to see if any of them are ready to assist you, and afterwards to native gentlemen of good repute in the city. When your arrangements are complete, you are requested to report the number of beats and the names of the inspectors of each. Your own duties should be confined to testing a percentage (not less than 5 per cent.) of the houses in each beat, to see that the work of visiting is thoroughly done, and the aid given is given with judgment and discrimination.

8. When the registers are prepared and the system is ready to be introduced, a day should be fixed after which no more relief in the shape of cooked food will be given to any one who does not enter the relief camp and abide by its discipline. That day should not be more than a fortnight hence, and the Chief Commissioner relies on your energy and experience to secure the due and rapid carrying out of these orders.

9. The form suggested for the registers required for the working of this system are appended, and printed copies will be immediately supplied to you by the press.

General Register of Houses requiring relief in Beat No._____

Inspector of Beat _____

No. of House.	Name of Recipient of relief in grain.	Name of Recipient of relief in materials for work.	

Grain Register.

No. of House.	No. of Ticket.	Name of Recipient.	Daily Amount of Grain.			
			Week 1st, Oct. 1 to 7.	Week 2nd, Oct. 8 to 14.	Week 3rd, Oct. 15 to 21.	Week 4th, Oct. 22 to 29.
		Total Amount payable by Bunniah				

Weekly Order on _____, Grain-dealer, from Inspector of Beat No. _____.

Pay to _____ ticket-holder No. _____, lbs of rice from _____ to _____ 1877.

Signed _____

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Register of Relief to Professional Artizans.

(A.) Cotton yarn for weaving.

Week, October 1st to 7th.

No. of Beat.	No. of House.	Name of Recipient.	Quantity of yarn given out.	Quantity of cloth given out.	Value paid for cloth.	

Register of Relief to Professional Artizans.

(B.) Cotton, raw, for spinning.

Week from to 187 .

No. of Beat.	No. of House.	Name of Recipient.	Quantity of Raw Cotton given out.	Quantity of Thread given in.	Value paid for Thread.	

Register of Relief to Professional Artizans.

(C.) Leather for shoemaking, &c.

Week from to 187 .

No. of Beat.	No. of House.	Name of Recipient.	Quantity of Leather given out.	Quantity of Work given in.	Value paid for Work.	

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Encl. in No. 271.

No. 258.

No. 2329 A., dated Naini Tal, the 4th October 1877.

From C. Robertson, Esq., Offg. Secretary to Government, N.W. Provinces and Oudh, to the Additional Secretary to the Government of India.

In continuation of my letter No. 1754 A., dated 22nd August, and with reference to your No. 749, dated 27th idem, I am now desired by his Honour the Lieutenant-Governor and Chief Commissioner to submit a further report on the condition and agricultural prospects of the North-western Provinces and Oudh.

2. The hot west wind, which sprang upon on 6th August, continued to blow until near the end of the month. On the 25th the east wind returned, and on the 27th there was a general but not heavy fall of rain in several districts of the Rohilkhand Division, and showers fell elsewhere.

3. On the 31st of August and 1st September, a severe storm, originating in the Gházipur District of the Benares Division, passed over the Benares, Jaunpur, Mirzapur, Allahabad, and Fatehpur Districts, and the south-east of Oudh. It then crossed the Jumna and went through Bánda, Hamírpur, and the Jhánsi Division. The fall of rain which accompanied did great good to the districts visited by the storm, but unfortunately it did not extend to the Duab, Rohilkhand, and western part of Oudh, where it was urgently needed.

4. The wind changed again to the west on the 8th September, and has continued since to blow with great violence and with damaging results to the crops throughout the provinces.

5. The meeting of the western and eastern currents led, however, to a heavy fall of rain, which was general over the greater part of the eastern districts on the 10th and 11th September; but since the latter date there has been almost no rain anywhere, and the whole of the Provinces have been devastated by a hot dry wind.

6. The following statement, which gives the average rainfall for each district from 1st June to this date, as compared with the average rainfall in the same period for the five years 1870–75, will show how scanty the fall everywhere has been, and that literally in many districts there has been no rainy season. The total fall is much less than in the worst years 1860 and 1868, of which we have records, and the failure has been more general throughout the Provinces:—

Districts.	Average Rainfall of Five Years, 1871–75, June to September.	Average Rainfall from 1st June to 14th September, 1877.	Remarks.
			Varying at different Tahsils, from—
Dehra Dún - -	80·2	23·4	18·5 to 29·1
Saháranpur - -	34·7	7·4	5·0 to 10·3
Muzaffarnagar - -	32·3	6·7	3·7 to 9·9
Meerut - -	28·4	4·4	2·3 to 7·8
Bulandshahr - -	30·5	3·4	2·0 to 6·2
Aligarh - - -	27·5	3·0	1·7 to 5·3
Kumaun - - -	53·2	23·2	18·2 to 33·9
Garhwál - - -	33·1	14·5	12·5 to 16·5
Tarái - - -	51·4	16·4	12·9 to 22·3
Bijnor - - -	45·9	7·6	5·1 to 9·3
Moradabad - -	45·1	8·9	3·3 to 14·9
Budaun - - -	38·8	6·7	3·7 to 11·5
Bareilly - - -	52·6	11·0	6·5 to 19·7
Sháhjahánpur - -	41·7	8·2	6·1 to 12·7
Muttra - - -	26·4	4·3	·8 to 11·9
Agra - - -	30·6	2·8	·6 to 4·75
Farukhabad - -	34·3	3·5	1·6 to 6·2
Mainpuri - -	36·1	2·9	1·25 to 6·6
Etáwah - - -	38·9	4·1	1·1 to 8·4
Etah - - -	31·1	4·3	2·8 to 5·4
Jalaun - - -	34·9	7·0	5·0 to 9·7
Jhánsi - - -	38·2	10·7	9·8 to 13·0
Lalitpur - - -	40·0	12·2	9·8 to 13·5
Cawnpore - -	33·6	4·8	2·9 to 8·3
Fatehpur - -	39·3	11·2	8·6 to 14·3

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Districts.	Average Rainfall of Five Years, 1871–75, June to September.	Average Rainfall from 1st June to 14th September, 1877.	Remarks.
			Varying at different Tahsils, from—
Bánda - - -	43·0	14·8	9·9 to 19·9
Allahabad - -	41·5	11·4	9·4 to 15·7
Hamirpur - -	36·6	10·6	6·9 to 13·9
Jaunpur - - -	42·3	16·9	12·0 to 23·1
Gorakhpur - -	46·1	12·9	7·3 to 16·8
Basti - - -	51·9	11·3	7·2 to 15·1
Azamgarh - -	39·4	11·9	8·7 to 14·3
Mirzapur - -	43·9	18·1	13·5 to 23·7
Benares - - -	41·1	21·2	15·3 to 26·35
Gházipur - -	37·7	11·0	8·7 to 14·1
Sultanpur - -	43·7	9·0	7·1 to 11·4
Partabgarh - -	35·3	9·1	7·6 to 11·3
Fyzabad - - -	40·6	11·9	8·5 to 16·0
Kheri - - -	43·0	15·6	13·0 to 18·1
Lucknow - -	38·7	4·6	4·0 to 5·0
Bara Banki - -	39·1	4·9	2·0 to 7·2
Bahraich - -	43·6	17·0	11·6 to 22·4
Rae Bareli - -	36·5	6·9	4·5 to 11·1
Sitapur - - -	35·0	8·15	5·8 to 11·3
Gonda - - -	42·8	10·9	7·4 to 16·8
Unao - - -	31·4	6·9	5·0 to 9·1
Hardoi - - -	31·4	6·8	5·4 to 8·4

7. The consequences of this disastrous failure of the usual rains are most deplorable for man and beast. The full effect cannot yet be determined, but it is now certain that in the Meerut, Agra, Rohilkhand, Sitapur, and Lucknow Divisions, and in parts of the Allahabad, Jhánsi, Rae Bareli, and Fyzabad Divisions, the unirrigated kharif crops are entirely destroyed. In Benares and greater part of Allahabad and Fyzabad it was hoped after the rain of the 10th and 11th, that from five to eight annas would be saved. but these hopes it is now known cannot be realised. The hot wind that has raged since the 11th has irretrievably damaged much that survived, and threatens to destroy all, A speedy fall of rain would yet save some; and in part of the Jhánsi Division there is also a little which is not yet utterly ruined.

8. Detailed statements were called for from every district of the condition of the crops when an extensive failure of the rains was seen to be inevitable. These were prepared in the end of August or the beginning of September, but give a more favourable estimate of the probable outturn than could now be made. An abstract of them is appended, but I am to refer you rather to the reports* from the Commissioners of Agra, Rohilkhand, Lucknow, Fyzabad, and Benares, which are herewith forwarded for fuller information on the condition of their respective Divisions.

* From Commissioner, Agra, No. A., dated 21st September 1877.
Ditto ditto Rohilkhand, No. 64, dated the 5th September 1877.
Ditto ditto Fyzabad, No. 2295, dated the 7th ditto 1877.
Ditto ditto Benares, No. 171, dated the 15th ditto 1877, and enclosures.
From Commissioner, Benares, No. 173 A., dated the 22nd ditto 1877, and enclosures.
From Commissioner, Lucknow, No. 2958, dated the 25th ditto 1877.

9. The general result is, as stated above, that except in parts of Benares, Fyzabad, and Allahabad, the outturn of the unirrigated kharif will be nil. Unfortunately the area of irrigated kharif is very small. Canal irrigation exists chiefly in the Meerut and Agra Divisions, and there the crops on irrigated lands are principally sugarcane, indigo, and cotton. Food-grains and fodder are generally grown on lands that depend on the periodical rainfall, and at the sowing season the cultivators could not foresee the terrible drought that was to prevail, and did not avail themselves of canal water for this class of crop.

10. At present the prospects of the rabi crop are as gloomy as the condition of the now ruined kharif. As far as appearances go the monsoon is over, and there is no indication of coming rain. Unless within 15 or 20 days there be a general heavy fall, the cold season crops can be sown only where irrigation is practicable. To the east of Allahabad the rain which fell on the 10th and the 11th would, it was expected, permit the rabi to be sown, but the effect of the hot winds since that date has been such as to render it very doubtful if even there unirrigated lands will be sown. The fate of the

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rabi crop will in a great measure be decided by the 15th of October, and on that date district officers have been directed to submit a return in the annexed form.

11. One of the most deplorable consequences of the failure of the kharif is the inevitable great mortality among cattle for want of fodder, and that too at a time when the need of cattle for well-irrigation is most pressing. Already in the Agra Division the cattle are being fed on the leaves of trees. Loss of cattle from starvation has been reported, and there is no means of providing sustenance for them.

12. Endeavours have been made to ascertain what supply of food-grain is stored in these Provinces, and how far it must be supplemented by importation, but great difficulty has been experienced in getting trustworthy information. It has been with some certainty ascertained that what grain there is in the Provinces is chiefly in the hands of dealers, and that the stocks held by cultivators and others are low. Generally the crops in these Provinces during the last two years have been good, but there were large tracts which each year did not share in the general abundance. The last rabi harvest in Rohilkhand and the northern part of the Provinces generally was deficient owing to heavy rain at the time the crop was ripening. Throughout great part of the Provinces also the grain was so wetted when lying on the threshing-floors that it was not fit to be stored, and was sold off for exportation. The demand for exportation to Madras and Bombay has also been great, and has drained the stocks in the Provinces considerably. The result of the detailed inquiries will be reported hereafter, but at present it may be said that the result, as far as can be ascertained up to date from data which must from the nature of the case be more or less imperfect, is that in Rohilkhand the grain locally available will suffice for about three months' consumption, while in the rest of the Provinces it may last for six months or more. But it is right to add that the crisis has already caused large importations from both the Panjab and Bengal, which have had the effect of arresting the rise in prices; and if these sources can continue to be relied on, we shall not be in want of food, although we shall have to find works to enable the poor to obtain money to buy it. But, notwithstanding this aid, the following statement will show the great advance which has taken place in prices since the 1st of July:—

—	Wheat.					Barley.					Rice (common).					Bajra (Millet).				
	30th June.	31st July.	15th August.	31st August.	15th September, or later date.	30th June.	31st July.	15th August.	31st August.	15th September, or later date.	30th June.	31st July.	15th August.	31st August.	15th September, or later date.	30th June.	31st July.	15th August.	31st August.	15th September, or later date.
Meerut - - -	25½	21	17	16½	11½	38	31	28	21½	15	14	13	12	12	9½	20	20	18	17	13
Bareilly - - -	18½	17½	14½	14½	9½	28½	27½	20	20	13	13½	13½	12	10½	8½	16½	16½	11½	5	9
Sháhjahánpur - -	22½	19½	16½	15½	10½	40½	34½	23½	22½	13	16	14½	12½	11½	7½	—	—	—	—	—
Agra - - -	20	18	16	14½	10	27¾	25	21½	17¾	11	13	12	11	9	7½	19	19	17½	16½	11¾
Allahabad - - -	17¾	16	16½	14½	14	29½	27	27½	22	19¾	16	14	13½	12	10½	24½	20	18½	18½	17½
Lucknow - - -	20½	18¾	17¾	15½	10½	29¾	27½	26	20	15½	13½	13½	12	11	9½	18½	16	15	15½	—
Fyzabad - - -	19½	17½	17	14½	12½	28½	24	24	20	17½	14½	12½	12	9¾	8½	16	16	—	—	11¾
Benares - - -	17	15	18	12½	12½	28	24½	28½	19½	17½	16	13	14½	12	11½	—	19	19½	—	14¾
Basti - - -	21½	19¾	17½	15	9½	32½	30½	30	20	12½	15½	14	13½	11	9½	—	—	—	—	—
Jhánsi - - -	21	20	19½	15¾	13	29	28	27½	19½	18	16	16	15	14	12½	—	—	—	—	—

Prices are now in the worst places more than double what they were three months ago, and are higher than they were at a corresponding period in 1868. They verge on famine rates.

13. Under the combined influence of high prices and stoppage of field work great distress has appeared among the labouring classes, which has compelled this Government to sanction the opening of relief works. The measures taken in this way have already been reported in my letter No. 2074 A., dated 14th instant. As then stated Colonel Fraser, Chief Engineer, Public Works Department, and Mr. C. Anderson, Chief Engineer, Irrigation Branch, were deputed to the head-quarters of divisions to decide, in consultation with commissioners and district officers, on what works labourers should be employed. A copy of the reports of their proceedings,* and of the orders issued thereon,

* Minutes of a meeting held at Agra on the 14th, 15th, and 17th September 1877.
To Commissioner of Agra, No. 2233 A., dated 29th September.
Minutes of a meeting held at Meerut on the 18th, 19th, and 20th September 1877.
To Commissioner of Meerut, No. 2238 A., dated 29th September.
From Colonel Fraser, on special duty, No. 13 B.R.T., dated the 9th September 1877, and enclosure (minutes of meeting at Bareilly).
To Commissioner of Rohilkhand, No. 2030 A., dated the 13th September 1877.
Minutes of meeting held at Lucknow on the 10th and 11th of September 1877.

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is herewith submitted for the information of the Government of India. It will be observed that the expenditure from provincial funds already sanctioned amounts to—

	Rs.
Rohilkhand	1,64,196
Sitapur, Lucknow, Rae Bareli, Fyzabad, Benares, Allahabad	Small amounts not yet reported.
Agra	3,63,257
Meerut	1,53,704
Jhánsi	28,000

Distress has increased so much since the middle of September that in every division works must be opened almost immediately.

14. There have been numerous grain riots or dacoities in most of the distressed districts, to repress which vigorous measures have been taken, and which should cease now that relief works are or will be provided. There has also been some emigration from parts of the Agra, Rohilkhand, and Jhánsi Divisions, which the measures taken to provide relief are expected to check. It is trifling compared with the enormous exodus reported to have taken place from Gwalior, Dholpur, and other native states, partly into the Duab, but chiefly through Jhánsi to the south and west. Had the emigrants been able to find their way to a land of plenty, their going from one district to another might have been regarded with indifference, but when the whole of the provinces are almost equally unfortunate, the influx of homeless wanderers is only embarrassing.

15. Many of these wanderers were so emaciated, and many of those who live on charity were so reduced by want of food, that it has been imperatively necessary to authorise the opening of poor houses in the districts of the Rohilkhand and Agra Divisions and elsewhere. His Honour has directed that they shall be conducted on the system followed so successfully at Moradabad in 1860–61 and enjoined in the famine of 1874. His Honour has also directed that where they are opened an appeal be made for their support to the liberality of the wealthier sections of the community, undertaking to give on the part of Government a grant for initial expenses, and the equivalent of all sums raised by subscription. His Honour has also sanctioned the grant of takávi for the digging of wells in places where they can advantageously be made and good security be given, and for the purchase of seed grain should rain fall and otherwise the lands remain unsown. The amounts yet sanctioned have have been as follows:—

	Rs.
Meerut Division	50,000 for wells.
Agra ditto	90,000 for wells and seed grain.
Bánda District	10,000 for seed grain.
Jhánsi ditto	3,000.

The amount required for other divisions cannot yet be stated.

His Honour trusts that his orders will be confirmed by the Government of India.

No. 259.

Telegram, dated 5th October 1877.

From Viceroy to Secretary of State.

Season telegram, 25th September to 3rd October. Madras.—Continuous good rain everywhere, except part of Coimbatore and Madura. Good freshes in rivers; crops thriving; north-east monsoon not yet appeared on coast. Works, 628,259, decrease 70,000; gratuitous 1,603,721, decrease 2,000. Madras revised orders for administration relief issued 24th September. General but slight fall in prices; imports fully maintained. Bengal and Burmah daily grain despatches to Madras ports 5,454 tons, besides from Peninsula Railway 900 tons. Railway working from Madras meagre.

Bombay.—No appreciable rain in Gujerat, where needed; rest of Presidency good general rain. Temple telegraphs: General situation markedly better. Works 219,910, decrease 23,000; gratuitous 163,008, increase 3,000.

Mysore.—Good rain continues; crop prospects good; prices slightly cheaper; supply of sufficient railway imports; reduced people returned to field pursuits. Works 54,000, gratuitous 162,000. Deaths in Bangalore temporarily increased from rain. Famine Commissioner telegraphs that effect of putting paupers on works is marked improvement in health and spirits; they crowd to works.

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North-West Provinces.—No rain save showers in Ghazipore; drought and heat continue; distress felt in Agra and Rohilkund Divisions.

Condition in Oudh less serious; prices stationary but high; grain being imported from Nerbudda Valley; October rain would save spring crop; cloudy weather reported on 4th from several districts; suitable relief work arrangements in forward state.

Punjab.—No rain save in Rawul Pindi and frontier; no improvement except Multan Divisions; dear prices; distress not yet reported.

Rajputana.—Partial showers in Ajmere and Marwar; no rain elsewhere; drought increasing in Eastern States; prices not yet excessive; relief works arranged on three sections of railway.

Indore.—No rain, except at Neemuch. Malwa crops beginning to wither; Gwalior condition bad. Great emigration from Northern and Eastern States southwards. Relief work open on three railway sections near Gwalior, Neemuch, and Rutlam.

Hyderabad.—Moderate showers; crop prospects favourable.

Bengal.—Prospects good in Bengal proper. Anxiety about South Behar, where rain holds off.

Burmah.—Prospects favourable; floods subsided; rice being replanted.

Assam.—Prospects good.

Central Provinces.—Protracted break in rains causes some loss of crop, and anxiety in rice-growing tracts; rabi (?) crops good. Large number of immigrants from Central India States, for whom relief works provided.

Encl. in No. 271.

No. 260.

Telegram, dated 6th October 1877.

From Governor of Bombay, Ahmednagar, to Viceroy, Simla.

Bombay Chamber of Commerce have telegraphed urgently to me. Message begins:—"Markets in famine districts being amply supplied, and prices daily declining and lower than Bombay; all reason for preference to famine traffic ceased. Holders of grain in Nagpur, other stations, will continue to book it in order to clear stocks owing to preference given, and despatch to Bombay will continue closed, thereby inflicting continued great loss on Bombay trade and merchants."

Message ends. Your Lordship best judge of necessity for preference to twelve hundred tons daily for places beyond Bombay Presidency, namely Hyderabad and Madras. I apprehend that you consider this is still necessary, but I shall be obliged by instructions to make sure. Please reply to Ahmednagar.

No. 261.

Telegram, dated 7th October 1877.

From Governor of Bombay to Secretary of State.

Within past fortnight good rain fallen all over Bombay Presidency, excepting Khandesh and Sind. Autumn crop considerably though not entirely saved. Guzerat cotton crop improved, but short yield feared. Sowing for next spring crop everywhere good. Quantity of grass and fodder for cattle; prices falling. Numbers of people on relief works largely decreasing; numbers on gratuitous relief slightly increasing, as usual towards end of scarcity.

Encl. in No. 271.

No. 262.

No. 914, dated Simla, 8th October 1877.

From C. Bernard, Esq., Additional Secretary to the Government of India, to the Secretary to the Government of Madras.

I am directed to acknowledge the receipt of your endorsement enclosing printed copies of the instructions published by the Madras Government and their proceedings, No. 2847 of 24th September, and in reply I am to express the satisfaction with which his Excellency in Council regards the steps now taken to carry out in detail the line of policy determined on by the Madras Government during the Viceroy's visit to that Presidency.

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2. As these instructions have the concurrence and approval of the Government of India, it is unnecessary to comment on them in detail, but I am to say that his Excellency in Council observes with special satisfaction the beneficent arrangements contained in the paragraphs noted in the margin, which provide that in effecting the necessary transfer from gratuitous relief to public works, every possible precaution shall be taken so as to guard not only against loss of life, but against overtasking, against injury to health, and against the separation of families.

23, 24, 31, 32, 37, 45, 48, 51, and 53.

3. His Excellency in Council confidently anticipates that with the loyal co-operation of the district officers, and under their zealous supervision, the measures now taken will have the best results in enforcing economy, in checking peculation, in improving the health and condition of the people, in providing the Presidency with useful communications and increased protection against drought, and in reducing to a minimum the dangers of demoralisation.

No. 263.

Encl. in No. 271.

Telegram, dated 8th October 1877.

From Viceroy, Simla, to General Kennedy, Madras.

Temple has represented urgent demand of Bombay Chamber of Commerce for cessation of preference now given to grain consignments for Madras districts on all Peninsula stations. Chamber urges that famine districts are fully stocked and that their prices are below Bombay prices; also that consignors send to famine stations only because preference enables them thus to work off stocks. Temple asks if preference rule can be withdrawn. Duke recently telegraphed prices easier and supplies sufficient in Ceded Districts. But Madras Railway working short from Madras end. I much want to relieve Bombay export trade from pressure at earliest possible moment. Still famine needs are paramount, and I fear difficulties might arise on Madras line and in Ceded Districts by sudden cessation of supply. Does Madras Government consider it safe to reduce the preference waggons now allotted to famine consignment by one half from the 15th October, and to hold out hopes of withdrawing preference order entirely by 1st November, provided improved prospects continue? If so, then Madras Railway could arrange its engines accordingly. Early reply requested.

No. 264.

Encl. in No. 271.

Telegram, dated 8th October 1877.

From Viceroy, Simla, to Resident, Hyderabad, Deccan.

Obligation on Peninsula Railway to deliver daily 300 tons grain at Hyderabad causes inconvenience. Governor Madras telegraphs that new grain from Hyderabad is coming into Khurnool, and your prospects seem favourable. Can Hyderabad afford to reduce her obligatory famine demand on railway by one half from 15th October, and to withdraw it altogether by 25th October. Of course ordinary trade consignments would take their turn as in ordinary times.

No. 265.

Encl. in No. 271.

Telegram, dated 8th October 1877.

From Viceroy, Simla, to Governor of Bombay, Ahmednagar.

Your message regarding cessation of preference to famine consignments. I am anxious to meet wishes of Bombay trade at earliest possible moment. I have telegraphed to Kennedy to ascertain views of Madras Government. I hope an early reduction of number of preference waggons may be possible.

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Encl. in No. 271.

No. 266.

Telegram, dated 9th October 1877.

From Major-General Kennedy, Madras, to Viceroy, Simla.

Duke thinks that at this period, with present still excessive range of prices, no change should be made likely to lessen quantity of grain sent to Madras district. The character of coming season north-east monsoon will be known in a few days, and may affect the question either way.

Encl. in No. 271.

No. 267.

Telegram, dated 9th October 1877.

From Resident, Hyderabad, Deccan, to Viceroy, Simla.

Nizam's Government assents to reduction of obligatory famine demand on railway for Hyderabad to 150 tons from 15th October, but solicits two or three days for consideration as to its entire relinquishment from 25th October, the Government tenders its best thanks to your Excellency for your personal interest in this matter on its behalf, and for great facilities so afforded to grain importations for Hyderabad.

Encl. in No. 271.

No. 268.

Telegram, dated 10th October 1877.

From Viceroy, Simla, to Sir R. Temple, Bombay.

Have consulted Madras Government, who consider that during continuance of excessive prices of food no change should be made to lessen quantity of grain sent to Madras districts. Character of coming season and of north-east monsoon will be known, and matter can be re-opened. Resident, Hyderabad, agrees to reducing the obligatory deliveries and preference wagons for Nizam's line by one-half from 15th October, and he will telegraph in three days whether preference can be wholly withdrawn. I have asked Madras Government to watch supplies and prices, and to inform me directly preference can be reduced or foregone.

Encl. in No. 271.

No. 269.

Telegram, dated 10th October 1877.

From Viceroy, Simla, to General Kennedy, Bombay.

Please inform the Duke that I have telegraphed to Temple, we cannot at present agree to withdraw preference order. Hyderabad has agreed to reduce its obligatory deliveries by one half from 15th October. I am aware Madras Government watches prices and supply closely, and I trust early intimation will be sent when preference order can safely be reduced or withdrawn. Private source in Madras telegraphs that stocks there are rapidly accumulating, prices are falling, and demand from interior is weak. I am anxious to relieve the Bombay trade as soon as famine requirements permit from the temporary inconvenience under which it suffers. So, pray, keep the matter before Madras Government.

Encl. in No. 289.

No. 270.

No. 2401A, dated Naini Tal, 10th October 1877.

From the Secretary to the Government of North-western Provinces and Oudh to the Secretary to the Board of Revenue, North-western Provinces.

The Lieutenant-Governor having had under consideration the question of the suspension of the land revenue demand for the kharif kists, in consequence of the failure of the crops, desires me to communicate the following remarks, and to request that the Board will issue instructions in accordance with them, unless good cause can be shown for any modification.

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2. It is almost unnecessary to observe that the principle on which settlements have been made in the North-western Provinces is to fix a moderate average demand for a long course of years, the Government agreeing to relinquish the excess in a good year, and expecting that the deficiency of a bad year shall be made good from the accumulated surplus of past or anticipated surplus of coming years. Notwithstanding, therefore, the great deficiency of assets in the present year, his Honour considers that with reference to the character of the settlement, and the urgency of the demands on Government, remission of revenue ought not to be sanctioned except in very special cases. On this subject I am to forward for the information of the Board a copy of a letter No. 886, dated 4th instant, from the Secretary to the Government of India, Department of Revenue, Agriculture, and Commerce, with its Enclosure.

3. It may, however, in many quarters be necessary to suspend the demand, and it is with reference chiefly to the extent to which suspension should be granted that it is desirable that instructions be communicated to collectors. The demands on Government for funds are at this moment so pressing that it is impossible to authorise a general suspension, nor, great as the failure of crops in some districts has been, is a measure of this sort imperatively called for. In most districts a portion of the crops will be saved, and owing to the rise in prices, the deficiency of produce will be compensated for by the increase in the value of the crops saved.

4. His Honour must therefore direct that zemindars who are well off capitalists, who have other sources of income, and those whose tenants have saved a portion of their crops, and generally all who can pay up, should be required to do so. In particular the revenue ought to be realised without hesitation from those zemindars who have failed to help their tenants in the hard times they have come through, though they had the means of doing so. Such landlords deserve no indulgence.

5. On the other hand, suspension must be granted to those who could not be made to pay up without reducing them to such straits as would render them unable to incur the necessary expenditure on the cultivation of their lands in the cold season. It is to be borne in mind that owing to the large area now lying fallow in consequence of the kharif crop not having been sown, landowners will have the means of meeting any suspensions which may now be granted them by bringing this area under cultivation for the rabi. Some indulgence might also be shown to those who in the past have already helped their tenants, and who are prepared to continue this help during the cold season until the next harvest ripens, if not compelled to pay up the revenue.

6. In regard to these, a large discretion must be allowed to collectors. His Honour is confident that it may safely be given, and that while every effort is made to realise what is urgently required by the necessities of the State, undue pressure will not be put on those who ought to be treated with indulgence.

No. 271.

No. 38 of 1877.

From the Government of India, Public Works Department, to the Most Honourable the Marquis of Salisbury, Her Majesty's Secretary of State for India.

Famine.

Simla, the 11th October 1877.

In the Viceroy's letter of 26th September your Lordship was informed of Lord Lytton's return from the famine-stricken districts in the south of India. In his previous letter dated Bangalore, 20th September, the transfer of the Famine Department to the personal management of his Excellency the Viceroy had been notified, but the office remained a branch of the Department of the Revenue, Agriculture, and Commerce. On Lord Lytton's arrival at Simla it was decided that the administration of famine relief should be a branch of the business of the Public Works Department, and Mr. Bernard, who had accompanied the Viceroy on his tour as Additional Secretary for Famine Business, was accordingly transferred from the Revenue, Agriculture, and Commerce Department to be additional Secretary in the Public Works Department.

2. The transfer was a necessary corollary to the principle already laid down by the Government of India, that the employment and payment of the destitute on useful public works, supervised by departmental agency, was to be the backbone of the relief system, and as this principle has been acted on in Bombay from the beginning, and more recently in Madras, conformity to it required that under the Government of India also the Famine Department should be deemed to be a sub-division of the Public

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Works Department. And all questions relating to relief works and their administration will now be considered and determined in that Department.

3. The initiative in all general matters concerning the Famine Department remains, however, in the Viceroy's hands; and to assist him in the work of the Department his Excellency has been pleased as a temporary measure to appoint Mr. S. C. Bayley to be his personal assistant.

4. The Viceroy desires to take the opportunity afforded him by the notification of these changes to your Lordship of placing on record the deep obligation he is under to his colleague Sir A. Arbuthnot, both for his general management of the Famine Department during the last 10 months, and especially for the loyal assistance which he rendered during the recent journey to the south of India. It was a matter of regret to his Excellency that for that journey the services of Mr. Hope, who, as additional Secretary in the Famine Department, had conducted the anxious duties of the Department in complete accordance with his Excellency's views, and entirely to his satisfaction, were not available; Mr. Hope, who represents the Bombay Presidency in the Legislative Council, having previously at his own request resigned the office of Additional Secretary. The Viceroy thinks it due to Mr. Hope to acknowledge in this place his careful and efficient performance, from the beginning of the famine down to August last, of the additional and burthensome duties undertaken by him in the Famine Department.

5. Taking the several provinces affected or threatened with famine in the usual order, we have the honour to report the facts and transactions of the week, as follows:—

Madras.

6. The Madras Government has issued revised rules for the administration of relief, with a view of giving effect to the decisions taken by the Viceroy and the Governor in Council at the end of August. There was some, apparently needless, delay in issuing these orders. But now that they are issued, and that the prospects of the season are favourable, we have every hope that the due execution of them will secure the systematization of relief, the prevention of fraud, the stoppage of much needless expenditure, and the employment of relief labour on properly supervised works of permanent usefulness. The revised rules together with a letter conveying our approval of their scope, will be found in Enclosure No. 250. No. 1 of the present letter. Full care has been taken to provide against overtasking persons who may be in a reduced condition of body; and the special treatment of weak persons is enjoined until such time as they shall be fit for full work. We anticipate that the operation of these rules, acting concurrently with the very favourable change in the season, will cause a very great reduction in the number of relief recipients throughout the Madras Presidency. A table showing the useful public works opened for relief labourers in each district has been prepared and sanctioned by the Government of Madras. But as the papers on the subject have not yet reached us, we reserve our remarks on that subject for a future letter.

7. We cannot conceal from ourselves that many native subordinate officials are personally interested in the continuance of unnecessarily lavish relief expenditure in Madras, and that it is by no means easy to close the doors kept open by them to peculation and illicit gains. Such persons will no doubt contrive to throw discredit on the recent reforms; and they will, it may be feared, take care that some really necessitous people shall remain unrelieved, in order that their complaints may gain hearing. A No. 84. paper received to-day from the Madras Government (Enclosure No. 2) shows in a melancholy way how subordinate officials sacrifice the interests and the lives of the poor, in order to procure the continuance of a system whereby they can make illegitimate profit. We have taken great pains, and so also has the Madras Government in the present revised rules, to guard against the occurrence of such disasters. But we are convinced that it is right, even though such cases should unhappily happen, to persevere in the only course which will prevent the pauperisation and demoralization of the people, and check the needless expenditure of hundreds of thousands of pounds.

8. The latest intelligence from each province will be found in the last paragraph of this letter. On the 5th current the Governor of Madras telegraphed that prospects were everywhere improved by the rain; that prices were falling in the Ceded Districts, into which supplies of new grain were coming; and that the Madras Railway was carrying smaller quanties of grain into the interior. At the same time the despatches of grain from Bengal and Burma to Madras ports fell to 2,124 tons daily during the week ending on the 3rd, as compared with 5,454 tons daily during the previous week. We at the same time learnt from Calcutta that grain despatches were likely to become even smaller, because dealers were uncertain whether further importations would be required after the large stocks now in Madras had been worked into the interior. We have informed the Madras Government how matters stand, at the same time we are not

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apprehensive of any shortness in the food supply. The Chief Commissioner, Mysore, telegraphs that the railway supply to Bangalore, though much short of the demand previously estimated, suffices for all requirements. Small crops are daily being harvested. And, if the favourable weather continues, no one will store grain so long as prices remain high. A telegram has to-day reached us from a private source in Madras stating that "business has been overdone, prices are daily falling, demand for the "interior is very weak, and stocks in Madras are rapidly accumulating." This intelligence has not yet been confirmed officially, but its purport is borne out by the general course of the trade, and agrees with our anticipations that old stocks would come out, and that the demand for importations would slacken as soon as the prospects of next harvest were assured.

The Governor of Madras has himself gone southwards to visit Salem, Coimbatore, and Madura; regarding which districts only is there ground for present anxiety.

9. Until the 5th current there was anxiety about the crops in Guzerat, where rain was much needed. But heavy rain has now fallen all over Guzerat, and the crops there are quite safe. Sir Richard Temple telegraphs that crop prospects throughout the Presidency are favourable; that prices are falling steadily; and that the situation is decidedly better, although more rain is still wanted in parts of the Khandesh and Násik districts. The numbers on relief works have fallen to 183,613, showing a decrease of 36,121; the numbers on gratuitous relief are 162,348 or nearly the same as in the preceding week.

Bombay.

10. The supply of food grain in the Bombay districts is sufficient; it is expected that consignments from Central and Northern India by the Great Indian Peninsula Railway will decrease, partly in consequence of the cheaper prices in the Deccan and partly in consequence of the demand arising in the North-west Provinces, where dearth was already felt and famine was threatening. Since the 25th September grain consignments, from railway stations as far east as Bhosawul Junction, have been going northwards towards Cawnpore and Agra. In view of the lessening demands of the famine districts and of the inconvenience caused to Bombay trade by the partial stoppage of consignments to Bombay for export, the Chamber of Commerce earnestly requested that the preference shown to famine traffic at stations on the Great Indian Peninsula Railway might cease. The Government of Madras has been consulted; and it has been decided to reduce the number of preference waggons for the Nizam's country by one half from the 15th October, but to await the burst of the north-east monsoon before withdrawing the preference order in favour of grain consigned to Madras districts.

The telegrams which have passed upon the matter will be found in Enclosure No. 3. The Government of India is anxious to meet the wishes of the Chamber of Commerce as soon as the paramount requirements of the famine districts permit a material reduction of grain importations. Before leaving this subject, we desire to record our sense of the loyalty and care with which the Government of Bombay has, notwithstanding much pressure from local interests, carried out the instructions of the Government of India, and secured a regular delivery of grain from the north to the Madras Railway.

Nos. 261, 263 to 269.

11. Great improvement in the season prospects have continued throughout the province of Mysore. During the last 10 days an average of three inches has fallen; even the central dry tract west of Bangalore, where rain has hitherto been withheld, has shared the recent rain. The irrigation tanks are filled; such of the early millet crops as had not withered have revived beyond expectation; irrigated millet and rice are being cut; the late millet crop looks as well as possible, and the sowing of spring crops is proceeding under favourable conditions. Markets are well supplied with grain, and prices continue to fall slowly but steadily. The latest returns (dated 29th September) from Bangalore show 57,274 persons on relief works, which is an increase of about 12,000; and 161,892 on gratuitous relief, as against 208,683 persons in the previous week. The latest weekly report from Mysore forms Enclosure No. 3*a* to this letter. That report says:—

Mysore.

No. 255.

"The decrease is partly due to the improvement in the prospects of field employment, and would have occurred in any case. It is partly due also to the enforcing of the conditions of residence and labour, and to the efforts made to relegate the paupers to works. Of the numbers in the relief camps of the Bangalore Municipality, which have fallen by 19,000 in the last fortnight, over 5,000 have been put on the State Railway and the adjacent embankment; about 2,000 on the embankment of the Alsur lake; and about 1,000 more on different projects, the waterworks, and two lines of road. The improvement in the condition of the labourers is already obvious; they are cheerful, healthy,

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and contented; and those who a fortnight ago were thought hardly able to lift a pickaxe are now doing a fair day's work. Of the rest, some have left for their villages, some prefer to beg about the town, but these will be collected and brought in by the police. To every applicant either labour or food is offered; if labour cannot be provided, then food is given till the applicant can be set to work."

12. In the beginning of the month of September there was some increase in the number of deaths reported from Bangalore town as due directly or indirectly to famine. On inquiry it appeared that, during the month of August, the daily average of such deaths was 30; from the 1st to the 10th of September the average was 41; from the 11th, the day on which Mr. Elliott, Famine Commissioner, took charge of his duties, until the 19th the number was 25; from the 30th to the 30th the average was 35. The Famine Commissioner attributes the increase of deaths to the cold rain which fell on several successive nights; he reports that deaths in the relief hospitals have diminished, and he anticipates improvement in the outside death-rate. These deaths occurred among the poor wanderers who came into Bangalore from outside; additional precautions are now being taken to find such persons and bring them under treatment, before they succumb to want or to diseases engendered by want.

13. Revised rules for the management of relief works have been issued, under the Chief Commissioner's orders, thus giving effect to the instructions of the Government of India. In these rules the wage scale provided for a rest on Sundays, and for the Sunday wage being distributed over the six days of the week. We have directed that, while the Sunday remains a non-working day, the wage scale be arranged so as to give full seven days' subsistence wage for the week.

14. These are now the crop prospects in the Nizam's country:—Rain has fallen in sufficient quantity; prices are cheaper, and the demand for imported grain is slackening. In Berar, where rain has fallen during the last few days, prospects are good.

Hyderabad.

15. The break in the rains had continued so long in the Central Provinces, that the position of the rice crop was critical; in some places part of the rice crop had actually withered. The millet and pulse crops were still in good condition, but rain was wanted for the spring crop sowings. Rain has now fallen in sufficient quantity at Nagpore, Hingunghat, and Saugor; and the Chief Commissioner reports that, if this rain is general, the prospects of the autumn crop will be everywhere improved. As Chutteesgurh and other districts of the Central Provinces are off the telegraph line, we are unable to write with certainty about those tracts. Into the northern districts of the Central Provinces there came daily, during the last 10 days of September, thousands of immigrants from the drought-stricken Native States and British districts lying in the basin of the river Chumbul. The number of these immigrants is now about 40,000, and for them the Chief Commissioner has provided relief employment on the road leading from the Jhansi border through Saugor and Damoh to Jubbulpore. We have agreed that the Government of India shall meet one half the expenditure on this relief work up to the 30th March, as most of the labourers will be immigrants; the remainder of the cost will be met from the ordinary provincial resources.

Central Provinces.

16. Up to the 5th October the drought and consequent distress had gone on increasing in Northern and Eastern Rajputana, and in most of the Eastern States under the Indore Agency. The price of wheat was 14 lbs. per rupee at Gwalior, and 17 lbs. at Ajmere; pasture for cattle had everywhere failed; tens of thousands of people were pouring through Neemuch, through Goona, through Jhansi, down into Malwa where the condition of the crops was becoming critical. Most of these emigrants were from Native States, but some came from British districts on the right bank of the Jumna. Among some of these poor people, on the great road between Seepree and Goona, cholera broke out. Relief houses were opened at Goona and other places on this road. But from all sides it was reported that severe famine would be felt all over the basin of the Chumbul river, if rain did not come. There was then (end of September) little hope of rain; and by way of providing relief employment for the immigrant poor, we sanctioned the immediate commencement of earthwork and ballast collection on the railway lines from Ajmere through Beawur to Dasori on the north, and on the line from Neemuch to Rutlam in the centre, of the threatened tract. In the east, work on the Gwalior and Agra Railway had previously been opened. Telegrams of the last three days have informed us of seasonable rain all over Central India and Rajputana, from Gwalior on the east to Mullanee and Palee on the west, and from Indore on the south up to Jeypore on the north. We have not yet had tidings from

Rajputana and Central Indian States.

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the Bikaneer and Jeysulmeer deserts. But it appears certain that the rain which has fallen, and which was continuing up to the 8th current, will provide pasture everywhere, and in many places will suffice for the spring crop sowings. If this favourable change continues, the danger of actual famine will have passed away, though scarcity and high prices must continue until the spring crop is secure. We shall not be able to counter-order the commencement of the railway relief works in these countries, until prospects are more assured.

North-west Provinces.

17. In previous letters and telegrams we have informed your Lordship that the unirrigated autumn crop had been lost over the greater part of the North-west Provinces and Oudh, and that the failure of crop had been most marked in the Rohilkund and Agra divisions. Until the 5th October rain held off, fodder for cattle was not to be had; there seemed no hope of more rain, and it was certain that unless plentiful rain fell within the month of October, the spring crop would be lost, and severe widespread famine would be inevitable. Happily there were a number of large useful public works, new canals, extensions, and rectifications of old canals, drainage channels, railway extensions, and railway projects, most of which were ready for commencement, and on which very large numbers of people could be usefully employed. The Lieutenant-Governor of the North-west Provinces had sent his chief engineer round all the threatened districts with a view to settling with the local officers a scheme for relief works. Some such works had already been begun, and we had ordered a contingent of engineer officers from other provinces to aid in completing the preparations for a system of provincial light railways which the Lieutenant-Governor, in concert with our colleague Sir John Strachey, who had visited Naini Tal, proposed as relief works in parts of the North-west where canal schemes were wanting. At Enclosure No. 4 will be found a letter from the North-west Provinces, dated the 4th October, describing the situation as it then stood. It will be observed that the rainfall had been less, that prices were higher, that crime, due mainly to want, was more rife, that panic among the people and the grain dealers was greater, and that emigration was more general than had been the case at the same season in the famine years of 1860 and 1868.

No. 258.

18. Happily this has all changed. Rain has fallen from the 5th to the 8th all over the provinces; we have not yet learnt full particulars from all parts of the country. Up to the morning of the 8th three inches had fallen at Agra, where the need was worst; and that the Native States to the west have received bountiful rain. We shall have the honour of informing your Lordship by telegraph of the exact condition of affairs. But at any rate the outlook is entirely changed; Sir George Couper has telegraphed that he does not require any more engineers, and that the project for light railways will not be necessary.

Punjab.

19. The condition of the Punjab was less critical than that of the North-west by reason of the heavy downpour of rain in August. Still there too most of the unirrigated autumn crop was lost; and the spring crops could not be sown unless rain came. The large stocks of grain in the province had kept prices below famine rates; no actual distress had been reported; and no relief operations had been undertaken, nevertheless the position was extremely anxious and critical. The rainfall of the past three days has happily extended to parts of the Punjab; six inches have fallen at Delhi, from one half an inch to two inches have fallen at Amballa, Jullunder, Lahore and Rawul Pindi; there has been half an inch at Amritsir. The Lieutenant-Governor writes that "this rain has been a great relief "to our anxiety; that there will now be great sowing of spring crop all over the "country where rain has fallen, but that prices will keep dear until the fate of the "spring crop is assured."

Bengal.

20. The only part of Bengal, regarding which there was anxiety, namely Behar, has shared the general rain. Three inches of rain were gauged at Patna on the 6th October. We have not yet received particulars; but the rain which fell both at Patna and Benares must have been general over Behar, and cause for anxiety there is past.

21. If the rainfall of the past week should have fully wrought the favourable change which we hope no time will be lost in stopping, as soon as matters are clear, the "extraordinary" undertakings which we have sanctioned for relief purposes. When the need for relief has passed, all such works will be considered and dealt with on their own merits, and with reference to the financial needs of the Government. We invite attention to a paper (Enclosure No. 5) in which the Bombay Government has declined to authorise any measures that will tend to keep up the numbers on any relief work. The Bombay Government has directed that every unfinished relief work shall, when famine

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needs are over, be considered and treated under the ordinary rules of the Public Works Department. We consider that in so deciding the Bombay Government has acted loyally to the Imperial Government and for the benefit of the Imperial treasury.

22. We cannot conclude this letter without expressing our deep thankfulness for the rain which has thus come just in time to save the whole of Northern India from a famine which threatened to be both widespread and severe.

23. Up to the time of this letter going to press, namely, the evening of the 10th October, we have received intelligence of rainfall in Northern and Central India since the 4th October as follows:—

Punjab	Peshawar	None.
	Rawalpindi	1 inch.
	Lahore	½ an inch.
	Jullunder	1 inch.
	Amballa	1⅓ of an inch.
	Delhi	6 inches.
North-western Provinces and Oudh	Agra	4½ „
	Bareilly	7 „
	Lucknow	2½ „
	Meerut	6 „
	Allahabad	4 „
	Benares	2½ „
Rajputana and Central India.	Jeypore	1½ „
	Ajmere	2 „
	Neemuch	7 „
	Bhurtpore	7½ „
	Gwalior	2 „
	Indore	3 „
	Rutlam	1¼ „
Central Provinces	Saugor	1⅓ „
	Jubbulpore	1 „
	Nagpore	4¼ „
Bengal	Patna	5½ „
	Durbanga	7 „

We have, &c.

(Signed) LYTTON.
F. P. HAINES.
E. C. BAYLEY.
A. J. ARBUTHNOT.
A. CLARKE.
E. B. JOHNSON.
W. STOKES.

Encl. in No. 289.

No. 272.

No. 792A, dated Naini Tal, the 11th October 1877.

From the SECRETARY TO THE GOVERNMENT OF THE NORTH-WESTERN PROVINCES AND OUDH to the SECRETARY TO THE GOVERNMENT OF INDIA, FINANCIAL DEPARTMENT.

I am directed to state, for the information of his Excellency the Governor-General in Council, that his Honour has learnt from the Accountant-General that the cash balances in the North-western Provinces and Oudh have fallen from 270 lakhs on the 1st of September 1877 to 162 lakhs on the 1st of October 1877, and that, unless the treasuries are replenished, there will not from the middle of November 1877 be funds to meet the liabilities of this Government.

2. His Honour deems it necessary to state for the information of the Government of India that, owing to the general and nearly complete failure of the kharif crops throughout the provinces, there is on the one hand very little prospect of the early realisation of any thing but a very small part of the land revenue demand for the kharif, while on the other the Lieutenant-Governor has been compelled to sanction a large expenditure for the relief of the distressed, and the grant of takavi for wells and seed-grain. Since the Accountant-General's letter was received, there has been a general fall of rain, which will permit the rabi to be sown, and has made the prospects

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of the provinces brighter, but nothing can restore the ruined kharif, or prevent a large suspension of the revenue demand.

3. The Lieutenant-Governor is well aware of the straits to which the Government of India is put at the present time for money, and it is with the utmost reluctance that he makes a report which must necessarily temporarily add to their burdens. But he sees no other course to adopt. If the village communities who form the great mass of our revenue payers be pressed now, they simply will be ruined, whereas, if we allow temporary suspensions there is every reason to believe that by the end of the agricultural year we shall recover all that we forego now from the proceeds of the additional area which the people will be able to bring under cultivation in consequence of the kharif not having been sown and the land being therefore available for the spring sowings. But if we press for immediate payment the people will not have the means of doing this, and they will be reduced to such a state that it is highly probable that the rabi instalments themselves will only be realised with great difficulty.

4. His Honour knows that our revenue theory is that the people should meet the losses of a bad year from the gains of a good one. But as a matter of fact these prudential considerations are unknown to them. They never save. When they have a good harvest they spend the proceeds on marriages or in other ways, and they have moreover been very seriously affected by the present scarcity. Cattle are reported to be dying or sold to the butchers in hundreds in consequence of the want of fodder, and this will add very materially to the agricultural distress and difficulties if they are called on at once to meet their State obligations.

5. Well-to-do zemindars and the owners of tracts in which there has not been a total failure of the autumn harvest will, of course, be made to pay up, but, as has already been stated, well-to-do landlords are the exception in these provinces, and it is quite certain that the tracts which have escaped the calamity are few and far between.

No. 273.

Telegram, dated 13th October 1877.

From Viceroy to the Secretary of State.

Season telegram 4th to 11th October:—Madras, moderate rain general everywhere; prospects of standing crops favourable; yield of crops just harvested moderate; agriculture briskly prosecuted; prices falling. Importation from outside much reduced; north-east monsoon not yet due. On works 587,228, decrease 41,031; gratuitous 1,531,255, decrease 72,466.

Bombay, excellent rain in Guzerat, good rain and generally good crop prospects in rest of Presidency, except Sind, where rainfall is deficient and prospects poor; prices falling; sowing of spring crops progressing; on works 182,158, decrease 37,752; gratuitous 162,348; decrease 660.

Mysore, moderate rain everywhere; crops flourishing; prices falling; on works, 69,693, increase 15,693; gratuitous 126,204, decrease 36,706; decrease due to work in fields.

North-West provinces, good rain everywhere, two to ten inches, heaviest in Rohilkund and Oudh, and very good in Agra; preparations for spring crop everywhere progressing; apprehensions of famine removed; prices falling everywhere though still high.

Punjab, general rain as far north as Jhelum, heavy in Delhi, and Umballa; spring crop sowings secured; now no fear of famine.

Rajputana, general rain over all States; heavy in Neemuch and some other parts; pasturage and spring crops secured; some pressure still in Marwar.

Indore, good general rain over all States; prospects much brighter; emigrants beginning to return.

Hyderabad, prospects continue good; prices falling.

Bengal, good rain over Behar, where it was much wanted; rest good.

Central Provinces, seasonable rain over whole country; small breadth of rice withered; all else good.

Assam and Burmah; condition good.

No. 274.

Encl. in No. 288.

Proceedings of the Government of Madras, Revenue Department (Famine Relief), dated 15th October 1877, F. R. No. 2,331.

The Governor in Council has, by a telegraphic order of the 13th instant, called the attention of collectors to the importance of utilising to the utmost the present favourable

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change in the season. The recent rainfall has materially restored the condition of growing crops; many crops are being now harvested; land is nearly everywhere in a fit state for cultivation; and the rains of the north-east monsoon may be shortly expected. Prices have been gradually declining. In this state of the country it is of the utmost importance to its future prosperity that every exertion should be at once made to induce, encourage, and facilitate the return of people to their own homes and ordinary occupations. There may not unnaturally exist some feeling of hesitation amongst many, especially amongst those who have wandered from their own districts, to leave their present shelter, but the interests of the country demand that every available hand shall be turned to agriculture, and every exertion used to increase and expedite the growth of the newly-sown crops, on which the people must rely to restore the prices of food-grains to a normal state.

2. That this necessity is appreciated by the people is evinced by the fact that large numbers have already, of their own accord, left works and camps for agricultural employ, and that in many districts the area cultivated is larger than usual at this period. Yet in these districts more, and in others much, can be done, and no divisional officer should feel satisfied while any available land in his division remains uncultivated.

3. The Governor in Council desires also to impress on collectors the urgent necessity for reducing, as rapidly as may be, the numbers who are receiving State charity on relief works, in relief camps, &c., and consequently of diminishing the heavy drain on current expenditure.

4. The general principles on which relief is to be administered are already laid down in G. O. of 24th September, No. 2,847. The Government have spared no pains to relieve and sustain and also to provide employ for the people; now, however, agricultural or other usual employment is obtainable, and district officers must take care that the measures which were necessary for relief of the famine-stricken are not converted into a prolonged demoralising and pauperising charity.

5. A judicious but firm application of the tests and limitations laid down in the Government Order referred to will prevent the danger while meeting any necessity; but laxity or indecision in any district may not improbably result in the continued dependence of a large pauperised population on State aid through another year.

6. Where the numbers on relief works are materially diminished, proportionate diminution should be made in the establishments, and labour should be consolidated so as to economise supervision. When the numbers in camps are materially diminished, subordinate establishments should be also diminished, or otherwise utilised, permanent officers of the districts being allowed to resume their ordinary work. The general relief organisation of a district, however, is not to be reduced or broken up until further instructions from the Government, the nature of which will be regulated by the advent and extent of the monsoon rains.

7. The Governor in Council has had before him applications for sanction for many new works of a petty and local character, the possible benefit to arise from which can only be of a purely temporary character. He considers such works undesirable, but does not, however, desire to fetter the discretion of collectors, and therefore will not generally refuse to sanction works recommended by them; but the sanction will only be accorded upon the distinct understanding that collectors, before recommending any works for sanction, satisfy themselves that such works are essential to the proper extent of relief, and are not urged from motives of purely local interest, or instigated by subordinates who hope for an opportunity to make an illicit gain from the relief expenditure.

Encl. in No. 288.

No. 275.

Telegram, dated 16th October 1877.

From Viceroy, Simla, to Secretary of State, London.

English newspapers received by mail show misapprehension about mortality in Madras Presidency. Actual returns for nine distressed districts including Madras town during six months, November to April, give results; total population 13,765,165 or 13¾ millions, deaths 373,993, of which 182,114 were reported due to cholera, which raged terribly during January, February, and March. During 1866 when famine visited

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northern districts of Madras, 200,000 cholera deaths were reported; monthly total deaths of past seasons were:—

November - - - - - - -	28,385
December - - - - - - -	56,725
January - - - - - - -	82,672
February - - - - - - -	76,745
March - - - - - - -	70,328
April - - - - - - -	59,136

By April cholera had greatly abated. Figures for subsequent months will be furnished hereafter. Death rate was thus 27 per thousand for the half year, 12½ per thousand being due to cholera. Madras Presidency reported death rate of 1875 was 21 per thousand; yearly death rate in India believed to be ordinarily not below 28 per thousand. The reported deaths of the half year thus exceed the reported death rate of 1875 by 16½ per thousand, or 227,123 cases, and they exceed the supposed normal death rate by 13 per thousand or 188,945 cases. This latter number somewhat exceeds total of cholera deaths. Impossible to say how much additional mortality due to famine. Rural registration of deaths not fully trusted. We propose to take census of selected areas in Mysore at end of famine and thereby ascertain actual losses of population. This was done in Bengal in November 1874. We shall recommend same course to Governments of Bombay and Madras.

No. 276.

Telegram, dated 17th October 1877.

From Governor of Bombay to Secretary of State.

Rain generally sufficient, Bombay Presidency; prospects, autumn and winter crops good; fine weather now wanted in Deccan. Numbers on relief works decreasing. Gratuitous relief still maintained for short time longer. Trade, both internal and external, continues active.

No. 277.

Encl. in No. 288.

Nos. 944, 945, and 946, dated Simla, the 17th October 1877.

From the Additional Secretary to the Government of India to the Additional Secretary to the Government of Madras, the Secretary to the Government of Bombay, Public Works Department, and the Additional Secretary to the Government of Mysore.

As there must be some doubt about the accuracy of the returns of deaths, furnished from the distressed districts during the past season, I am directed to suggest that at the end of the famine, steps should be taken to take a census of selected taluks in different parts of the famine country. This course was taken in Bengal during November 1874, and it was found that with the help of the extra famine establishments and of the village officials, the business could be done without any heavy expenditure, beyond the cost of lithographing a sufficient number of forms.

2. It is very desirable to ascertain how far the numbers of the rural population may have been affected by the famine; and it would be necessary, for this purpose, to count the people in some of the most distressed and also in some of less distressed taluks. If possible the counting should be postponed until the very end of the famine, when all the wanderers will probably have returned to their homes.

3. I am to ask you to let me know whether the * consider it practicable to carry out this suggestion.

* Government of Bombay.
" Madras.
Chief Commissioner of Mysore.

No. 278.

Encl. in No. 289.

No 2427A, dated Allahabad, 18th October 1877.

From the Secretary to Government of North-western Provinces and Oudh to the Additional Secretary to the Government of India.

With reference to your letter No. 886 (Famine), dated the 4th October 1877, I am directed to submit, for the information of his Excellency the Governor-General in

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To the Secretary to the Board of Revenue, North-western Provinces, No. 2401 A of the 10th instant.

Council, a copy of the letter marginally noted, showing the instructions issued by this Government in regard to the suspension of the kharif kists in consequence of the failure of the crops.

2. I am also to forward a copy of a letter No. 792 A, dated the 11th of October 1877, which has been addressed to the Government of India in the Financial Department.

Encl. in No. 289.

No. 279.

No. 6,276, dated 19th October 1877.

From the Chief Secretary to the Government of Bombay to the Additional Secretary to the Government of India.

I am desired by his Excellency the Governor in Council to report, for the information of his Excellency the Viceroy and Governor-General in Council, the following information regarding the realization of the land revenue of this Presidency in the year 1876–77, exclusive of the Province of Sind, where there was no drought.

2. The land revenue to be collected amounted to Rs. 2,62,99,590. Out of this the sum of Rs. 2,33,40,250 was collected on the 31st August 1877. The amount of remissions granted up to the same date on account of failure of crops through drought amounted to Rs. 2,15,110. As regards the residue, the subject was carefully considered by his Excellency the Governor in Council, and it was finally determined that all the outstandings should be treated as recoverable balances and so entered in the accounts.

3. Many of these balances are owing by people who are tolerably well off, and these will be gradually recovered with care and judgment when the ripening crops are brought to market. In other cases the monsoon of 1878 will be awaited. Should that prove abundant, and should a plentiful harvest be the fortunate result, it is confidently anticipated that these remaining arrears may, for the most part, be collected in 1878–79.

4. As regards those remissions which have been granted, his Excellency the Viceroy in Council may be assured that the utmost care and vigilance were exercised before granting them, and the Governor in Council is convinced that the liberality of Government has been very seldom misplaced, considering the enormous number of claims which had to be investigated. At the same time he can unhesitatingly assert that the large revenue which, in an exceptionally distressing time, has been collected, has been realised without any harshness or undue pressure.

5. A further report will be made in due course showing how the out standing balances are being recovered.

Encl. in No. 288.

No. 280.

No. 952, dated Simla, 19th October 1877.

From the Additional Secretary to the Government of India to the Additional Secretary to the Chief Commissioner of Mysore.

I am directed to acknowledge the receipt of your letter, forwarding copies of the Mysore Famine Code, drawn up, under the Chief Commissioner's orders, by Mr. C. A. Elliott, the Famine Commissioner.

2. I am to express the satisfaction of the Governor-General in Council with the completeness of this code, and the promptitude shown in its preparation and issue. The preface, and Chapters I. to IV., are all excellent. It remains for the Famine Commissioner, and the Divisional Commissioners, to see that these orders are fully and systematically carried out. The rules (pages 6, 7, 11, and 12, and Chapter IV.) provide sufficiently for the treatment of persons who, from age, illness, or emaciation, are unfit for hard work. Such persons, who were crowding the relief camps at the time of the Viceroy's visit to Mysore, will, if these rules be properly carried out, have every possible chance of recovering health and strength.

3. The wage-scale (Appendix I., page 13) was approved by the Viceroy and Governor-General at the time of its issue. But instructions have since been communicated to you, desiring that the wage-scale should be re-arranged, so as to give seven distinct

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days' wage. At present the wages of the whole week are arranged as six days' wages. The rules which direct that *ad interim* wages should be given to new comers, and that wages should be paid thrice a week until the people get strong and the system becomes known, will prevent evils, such as have, on occasions, arisen from the system of weekly payments.

4. Chapter V. of the Code, regarding village relief, appears to lay upon the village officials duties which may be beyond the powers of some of them. But the expenditure on village relief in Mysore has hitherto been small; and now that the famine is drawing to an end, no harm, it is to be hoped, will result from the imperfect obedience which in some villages may be given to the provisions of Chapter IV.

5. The appended papers regarding the house visitation in Bangalore town, the hutting of labourers, the shape of relief hospitals, and the sanitary arrangements at relief camps and works, are all useful and worthy of a place in the Famine Code.

6. Many of the provisions, and all of the principles embodied in Chapter I.–IV. of the Code, have been in operation for the last four weeks. And the Viceroy and Governor-General in Council has been glad to hear that the inmates of relief kitchens near Bangalore have improved greatly in health and spirits after 15 or 20 days on the relief works where they were well treated and regularly paid. His Excellency in Council has also learnt with pleasure that, under the present arrangements, the lamentable mortality in and near Bangalore town has gradually and steadily diminished. The Government of India will await with interest the reports of the village inspections to be effected under Chapter V. of the Code.

7. I am to request that you will, with the Chief Commissioner's permission, convey to Mr. C. A. Elliott an expression of the interest and approval with which the Mysore Famine Code of 1877 has been perused by his Excellency the Governor-General in Council.

No. 281.

Telegram, dated 20th October 1877.

From Viceroy to Secretary of State.

Season telegram, 12th to 18th October.—Madras: rainfall in all districts, averaging 1½ inches. Prospects of standing crops everywhere good. Autumn harvests yield moderate. Prices falling in Bellary, Kurnool, and Cuddapah. Quotations about 20 pounds per rupee for dry grain. On works 550,299, decrease 36,929. Gratuitous. 1,283,966, decrease 247,289. Regular burst of north-east monsoon not yet reported Grain importation slack, but supply sufficient, and large accumulations in Madras itself.

Bombay: Good rain in Deccan and Concan. Prices falling. Crop prospects good everywhere, except Sind, where gloomy. North-east monsoon reported from Dharwar. On works 119,881, decrease 62,277. Gratuitous 152,055, decrease 10,295.

Mysore: Heavy showers. General crop prospects good. Grain 19 pounds the rupee. Prices still falling. On works 62,506. Gratuitous 103,750, decrease 22,554. Mortality slowly decreasing, but still very high all through Mysore.

North-western Provinces: Cold weather set in. No rain. Spring crop sowings progressing everywhere. Prices high. Prospects generally good.

Punjab: Good rain Rawul Pindee; Moderate showers elsewhere. Spring crop cultivation progressing hopefully.

Rajputana: Spring crop cultivation progressing. More rain wanted in parts. Prices falling in places; steady elsewhere.

Indore: Prospects in Malwa and Bundelkund generally good. Some rain at Gwalior. Relief works being maintained for destitute immigrants.

Bengal: Central Provinces, Assam, Burmah; prospects generally good.

Hyderabad: 4 inches of rain. Prospects good. Prices falling.

Reduction of 356,790 during week on relief numbers in Bombay and Madras: causes decrease of 11 lakhs in monthly famine expenditure.

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Encl. in No. 289.

No. 282.

From the ADDITIONAL SECRETARY TO THE GOVERNMENT OF INDIA, to the SECRETARY TO THE GOVERNMENT, NORTH-WESTERN PROVINCES.

No. 957, Dated Simla, the 22nd October 1877.

I am directed to acknowledge the receipt of your letter No. 792 A., dated 11th October, to the address of the Financial Department. With reference to your first paragraph, I am to thank the Lieutenant-Governor for the early warning he has given; and to say that measures will be taken by the Comptroller-General, in communication with the Accountant-General, for the supply of funds to meet the requirements of the public service in the North-western Provinces and Oudh.

2. The Viceroy and Governor-General in Council, however, directs me to address you more at length on those parts of your letter which state that only a very small part of the autumn land revenue instalment can be punctually realised; that a large suspension of the revenue demand is unavoidable; and that heavy expenditure has been necessary for the relief of the distressed, as well as on advances for land improvement and for the purchase of seed grain. A subsequent telegram from the Accountant-General intimates that he expects 99* lakhs of land revenue, namely, 33 lakhs in November and 66 lakhs in December, to be collected during the last two months of the year; so that the prospects of collecting the land revenue may have improved much during the 10 days after the despatch of your letter under acknowledgment. The Governor-General in Council hopes that the collections will be even better than the Accountant-General anticipates. It is understood, moreover, that the timely rainfall of the 6th to 11th of October has obviated the need for any considerable expenditure on relief works in the North-Western Provinces or Oudh.

NOTE.—The average receipts of the North-western Provinces and Oudh for these two months, during the last four years, have been 147 lakhs.

3. In the event of its being proposed to issue orders for granting any general suspension of the land revenue demand in the North-western Provinces and Oudh, the Government of India desire to make the following observations. In the first place the failure of the autumn crop, though grievous and extensive, has not been universal. Over the greater part of the Benares and Allahabad Divisions, and over some of the south-eastern tracts of Oudh, the autumn crop has escaped. The yield may perhaps be short, but at present high prices the short crops will fetch more than a full crop would do in ordinary years; and in those tracts, at any rate, the land revenue can be punctually paid.

4. On the irrigated lands, again, the land revenue ought to be collected. It may be that many zemindars and ryots abstained from taking canal water for their autumn crops till it was too late. But it is clearly not the interest of the country, or of the public treasury, that such short-sighted policy should be encouraged. One great function of the irrigation canals is to insure the country against famine; if people, who live by the canal, do not take its water until too late in a year of drought, the efficacy of such an insurance is much impaired. And the Government cannot encourage such waste of opportunity by suspending the land revenue due on lands which were unproductive because the landowners failed to make timely use of the water brought to their doors.

5. But, apart from the specially favoured tracts, where the autumn crop was, or might have been, saved, the Viceroy and Governor-General in Council greatly doubts whether, according to the principles and practice of the revenue system of Northern India, the present circumstances are such as to warrant any general suspension of the land revenue demand. One crop only, and that not the greatest crop of the country, has failed on unirrigated lands.† There is every prospect of a good spring crop over an unusually broad area. This failure has come after two or three years of plenty; and years, moreover, when prices were higher than usual. It may be that great part of the profits from the high prices of the past season did not benefit the landholders and ryots, but went into the pockets of the village bankers and the grain-dealers. But these people have, as has been stated in recent correspondence, an interest in the produce of the soil, and in the due payment of the land revenue.

† NOTE.—In some of the lower districts of the Doab from 25 to 50 per cent. of the cultivated land is returned as protected by well irrigation.

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6. The experience of past famines and droughts in the North-western Provinces, moreover, warrants the belief that wholesale suspensions of the land revenue are not required, for—

In 1860 the land revenue collections of the North-western Provinces during November and December were - - -		128 lakhs.
In 1861 they were, for both Oudh and the North-western Provinces - - - - - - - - -		162½ „
In 1868 when the autumn crop failed over a great part of the country, and the spring crop was deficient, the land revenue collections of November and December were—		
North-western Provinces - - -	73 lakhs.	
Oudh - - - - - - -	72 „	
	——	145 „

It would thus be a new feature in the revenue administration of the North-western Provinces if the Government were to direct general suspensions of the autumn land revenue instalment because there had been an extensive failure of one crop only.

7. The Government of India does not, as at present advised, share the apprehension that the people will restrict their spring crop sowings, if they are pressed to pay punctually the greater part of their autumn instalment. The reports published in the Gazette show that cultivation for the spring crop is as yet making favourable progress. And it is not understood from your letter that recent reports have reached his Honour the Lieutenant-Governor of the stoppage of cultivation, or of lack of seed grain, over any considerable areas of the North-western Provinces or Oudh. The spring sowings will be nearly over before the land revenue instalments fall due; and the village bankers will, in the ordinary course of business, make advances on the crop in the ground.

8. The practice of neighbouring provinces may be adduced in support of what has in former years been the practice of the North-western Provinces. The districts of Behar are in the same case with the permanently settled districts of the Benares division; yet in the more general failure of 1874 not a rupee of the Behar land revenue was suspended in November and December 1874. During the present season the Lieutenant-Governor of the Punjab has directed that the November instalment shall be collected in full, reserving the grant of any necessary suspensions for the December instalment; yet the failure of the autumn harvest in the Hissar, Delhi, Amballa and Jullundur divisions has been considerable.

9. As your letter points out, the settlement in the North-western Provinces and in Oudh is with superior landholders, to whom a liberal margin of rent is left to meet the chances of bad years, and not with field occupiers as in Madras or Bombay. And therefore the landholders have, as of right, no claim to a suspension of the autumn instalment due from them. In districts like Agra, for instance, where the failure of crops and pasturage has been excessive, and in tracts where single villages are held by cultivating brotherhoods, there may be necessity for partial, but considerable suspensions of revenue. But it would be introducing a new principle into the revenue system of the North-western Provinces, and it would be a direct encouragement of the unthrift described in your fourth paragraph, if the Government were to suspend its demand on any great scale during the present autumn.

10. The Viceroy and Governor-General in Council does not desire to hamper the legitimate discretion of his Honour the Lieutenant-Governor of the North-western Provinces and Oudh; he does not counsel, indeed he would not approve, harsh and rigorous measures to extort the autumn instalments from people who really cannot pay; but he wishes that the collectors and their establishments should be allowed to collect the land revenue, with caution and consideration for the people, in the ordinary way; special cases or special tracts being admitted to special concessions. The Government of India considers that this course may, with the excellent and experienced revenue officers under the Lieutenant-Governor's command, be taken with safety both to the people and to the public treasury. It seems desirable that no general order advising or directing wholesale suspensions of land revenue should be issued, unless matters turn out to be more generally unfavourable than the Government of India is at present aware.

11. With this general expression of the views of the Government of India, the Viceroy and Governor-General in Council would leave the matter to the discretion of the Lieutenant-Governor, in the confidence that the great bulk of the autumn instalment

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of land revenue in the North-western Provinces and Oudh will be collected at the ordinary season, and that suspensions will be granted only in cases where they are absolutely necessary.

P.S.—Since the foregoing letter was in type, your letter, No. 2,427A., dated 18th October, has been received. The instructions of the Revenue Board, enclosed in that letter, in the main accord with the views expressed in the present orders of the Government of India. But there may be risk that, under those instructions, suspensions may be granted to deserving landholders not absolutely in need of such concessions. If, however, the injunction at paragraph 4 of your letter to the Board be obeyed, that "all who can pay up, should be required to do so," then the views of the Government of India will have been carried out. It will, doubtless, be understood by collectors that landholders who have credit, and can raise the necessary funds from their bankers, are to be reckoned among those "who can pay up."

Encl. in No. 280.

No. 283.

From the ADDITIONAL SECRETARY TO THE GOVERNMENT OF INDIA to the ADDITIONAL SECRETARY TO THE GOVERNMENT OF MADRAS.

No. 973, dated Simla, the 24th October 1877.

In my letter No. 856, dated 20th September last, was conveyed an expression of the hope entertained by the Government of India, that much of the arrears of land revenue due for the year 1876–77 would be collected if the season turned out favourably.

2. Since that letter was written there has been a very great change for the better in the prospects of the crops throughout the Madras Presidency. During the whole of September and October rain has in moderate but sufficient quantity fallen in almost every district. In some districts the irrigation tanks are fuller than they have been for years. In parts of the Godavery district the supply of river water for irrigation may have been short; and the early autumn crop has not yielded a good outturn by reason of the failure of rain during August;—still, so far as the weekly reports go, there seems every prospect of full winter and spring crops, provided the north-east monsoon is favourable.

3. The Viceroy and Governor-General in Council gathers from the returns of "area "cultivated and revenue collected," that in most districts the area sown this year is larger than the average of previous years, though the revenue collections have been lamentably (and perhaps unavoidably) short. If, however, this large area of crop turns out well, the Government of India would hope that the arrears of last year, and also the full demand of the current year, may be collected without fail. And I am to suggest that some expression of the views of the Government of Madras on this important subject might be conveyed to the Board of Revenue.

4. The punctual collection of the land revenue of the current year is of the utmost importance to the general finances of the Empire; for the expenditure and loss of revenue during the famine, probably not less than eleven millions in all, has very seriously reduced the cash balances of the Empire.

5. The Viceroy and Governor-General in Council does not desire, and he is confident that the Government of Madras would not adopt, harsh measures to compel the people to pay land revenue when they have no money and no credit. But his Excellency in Council believes that, with the crops now on the ground, and with moderately high prices, the Madras ryots will this year, unless the season prospects change, be able to bear their proper share of the country's burden.

6. In order to show that the Government of India is not asking of Madras more than it asks and receives from other provinces, I am directed to forward copies of the letters marginally noted. From these papers it will be seen that, notwithstanding the very extensive failure of the autumn crop of 1877, the Governments of the Punjab and North-western Provinces are expected to collect punctually the greater part of the autumn instalments of land revenue, and that not a rupee of the demand will be remitted, unless circumstances change greatly for the worse. In the Bombay Presidency also, where the land revenue is collected directly from petty occupiers (ryots), as in Madras, 88 per cent. of the land revenue demand of 1876–77 (the famine year) had been collected by the end of August, and less than one per cent. had been remitted. An assurance has also been received from the Bombay Government that, if the winter and spring crops of the present season are good (as it appears they

No. 282. Famine Department letter No. 957, dated 22nd October, to the Government, North-western Provinces.

No. 279. Bombay Government letter No. 6,276, dated 19th October, to the Famine Department.

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will be), the whole land revenue demand of 1877–78 will be collected as in ordinary years.

7. The Viceroy and Governor-General in Council would ask that, as soon as the Government of Madras is able to form an estimate of the season, he may be favoured with an estimate of the amount of land revenue that will probably be collected in the Madras Presidency before the 1st June next, both on account of—

(*a.*) The arrears of the year 1876–77;

(*b.*) The current demand of the year 1877–78.

No. 284.

Encl. in No. 289.

Telegram, dated 26th October 1877.

From the CHIEF SECRETARY, Bombay, to MR. BERNARD, Simla.

Your telegram of to-day. Demand for the districts, which yielded Rs. 2,33,40,250 this year, as per my letter of 19th October, was for 1874–75 Rs. 2,59,85,640, collections were Rs. 2,58,25,619, balance Rs. 1,60,021; for 1875–76, demand Rs. 2,60,32,735, collections Rs. 2,58,70,222, balance Rs. 1,62,513.

No. 285.

Telegram, dated 26th October 1877.

From the VICEROY to the SECRETARY OF STATE.

Season telegram, 19th to 25th October. Madras: Rain general in all districts; average over 2 inches in Madras, Trichinopoly, Salem, Coimbatore. Duke telegraphs to-day that north-east monsoon set in on 16th, but wind unsteady; heavy and partial storms, frequent and general, except near Madras; prospects generally improved, except Godavery Delta, Ganjam, and part of Madura. Message ends.

Weekly report of crop prospects good; prices nowhere dearer than 19 or 20 pounds per rupee for common grain. No fear for Ceded Districts, but some anxiety about irregularity of monsoon in coast districts. Importations by sea and rail average 1,500 tons a day. Demand from interior slack.

On works 484,365, decrease 66,924; gratuitous 1,060,034, decrease 223,932. Administrative arrangements of August working well.

Bombay: General prospects good, save Sind, where no improvement; some damage by excessive rain in some parts of Concan, Deccan, and Dharwar. On works 98,773, decrease 26,108; gratuitous 139,594, decrease 12,641. Preference in favour of grain consignments on Peninsula Railway withdrawn, and traffic to Bombay for export free.

Mysore: Weather showery, crops flourishing, health improving, but mortality still high. Price of common grain 20 pounds per rupee. On works, 72,202, gratuitous, 88,757.

North-west: No rain save partial showers.

In Punjab, spring crop sowings progressing well, prices high, but steady.

Rajputana and Indore: Relief provided for immigrant poor near Ajmere and Neemuch on railway works, also near Gwalior and Rutlam, and road work near Goona. Special relief arrangements made for returning emigrants and wanderers on Agra and Indore road, where distress reported. Other provinces prospects good. Satisfactory report of land revenue collections from Bombay. Relief expenditure decreasing rapidly.

No. 286.

Encl. in No. 288.

No. 979, dated Simla, 26th October 1877.

From the ADDITIONAL SECRETARY TO THE GOVERNMENT OF INDIA, Public Works Department (Famine), to the ADDITIONAL SECRETARY TO THE GOVERNMENT OF MADRAS, Revenue Department.

It is with the greatest satisfaction that his Excellency the Viceroy in Council has received a copy of the proceedings of the Madras Government in the Famine Department, No. 2,331, dated the 15th instant.

2. The favourable change in the season which is described in your first paragraph is most hopeful, and his Excellency in Council is glad to learn by a telegram received last night that the north-east monsoon has at length arrived to supplement and complete the hopeful prospects for the future.

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3. The orders of his Grace the Governor urging all district officers to take the fullest advantage of this satisfactory change in the prospects of the season by inducing people to return to their ordinary avocations, are most judicious and opportune, for, as he justly observes, "the interests of the country now demand that every available hand "shall be turned to agriculture," and no less necessary is the caution conveyed to district officers to "take care that the measures which were necessary for relief of the "famine districts are not converted into a long demoralising and pauperising charity."

4. The returns received during the past three weeks show that with the returning prospects of agricultural prosperity, the orders issued by the Madras Government on the 24th September have already borne good fruit, the numbers of people receiving Government aid having diminished during the current month by 6¾ lakhs, or by more than one fourth of the whole number; and his Excellency in Council doubts not that with the continued improvement in agricultural prospects and with the steady fall in the price of food which should be the natural consequence thereof, the admirable orders now issued by the Madras Government will have the effect of speedily restoring the province to its normal state, will foster the habitual self-reliance of its people, and will relieve the imperial finances from the severe strain which during the past season they have undergone.

Encl. in No. 289.

No. 287.

From the Additional Secretary to the Government of India to the Chief Secretary to the Government of Bombay. No. 983.

Simla, the 29th October 1877.

I am directed to acknowledge the receipt of your letter, No. 6,276, dated 19th October, reporting upon the collections of land revenue in the distressed districts of the Bombay Presidency, on account of the demand of the famine year 1876–77.

2. The Government of India gather from your letter that out of the whole land revenue demanded of the year 1876–77, 88 per cent. had been collected up to the end of August last; that as yet only one per cent. of that demand has been remitted; that the greater part of the unremitted balance (Rs. 27,44,230) will be gradually recovered, as the people are able to pay; and that the "large revenue which, in an exceptionally "distressing time, has been collected has been realised without any harshness or undue "pressure."

3. The Viceroy and Governor-General in Council desires to congratulate the Bombay Government and its revenue officers most cordially on the result which has thus followed the policy adopted by his Excellency the Governor in Council in February last, and subsequently carried out by the present Government of Bombay. The Imperial treasury, on which such heavy demands have been made for relief expenditure, has benefited greatly by the careful regard which has been paid in the Bombay Presidency to the interests of the public revenue, It is specially gratifying to the Government of India to learn that no harshness or undue pressure has been exercised in realising the State dues. The diligence and success with which the Bombay ryots have set themselves to make the best of the present favourable season, are good evidence that the payment of the Government revenues did not press too hardly upon the people. This result is, the Government of India believe, in great part due to the care with which Bombay revenue officers investigated every individual case, in which suspension or remission of land revenue was claimed.

No. 288.

No. 39 of 1877.

From the Government of India, Public Works Department (Famine), to the Secretary of State for India.

Simla, the 30th October 1877.

No. 271. In our letter No. 38 (Famine), dated 11th October, we had the pleasure of reporting to your Lordship the very favourable change caused in the prospects of the season by the rainfall in Northern, Western, and Central India, during the second week of the present month.

2. Since the date of that letter matters have gone on satisfactorily. Taking the several provinces in order we have to report as follows:—

Madras. Favourable rain has fallen regularly throughout the Presidency of Madras, gauging, on an average, about two inches a week up to the 22nd October. The north-east monsoon (or latter rains), on which the crops in the districts of the Coromandel Coast and the Carnatic greatly

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depend, did not burst with its usual vigour. But the change of wind from S.W. to E. set in on the 16th; and since then partial but heavy storms have fallen in most parts of the Presidency. Up to the 26th the monsoon was unsteady and variable; the latest telegram, dated 30th October states that the—

"Monsoon burst in Kistna, Nellore, Kurnool, Bellary, Cuddapah, Madras, Chingleput, South Arcot, Tanjore, Trichinopoly, Madura, Tinnevelly. Not yet reported burst in Coimbatore, Salem, North Arcot; failed at present in Ganjam, where crops withering; in Vizagapatam and Godavery bursting doubtful."*

Successive weekly reports have shown that the early crops which suffered much from the drought during August had revived greatly from the September rain, and have yielded an outturn averaging more than half of a full harvest. The winter crop is almost everywhere in good condition; cultivation and sowings for the spring crops are making satisfactory progress.

3. Prices have fallen steadily both at Madras and in the interior; at Bellary and Kurnool in the north, and at Tinnevelly and Madura in the south, the quotations of the cheaper food grains range from 19 lbs. to 20 lbs. per rupee. Importations of grain by sea and by railway have decreased considerably; the despatches of rice from Bengal and Burmah to Madras ports averaged during last week 1,095 tons daily, as compared with 5,454 tons daily during the corresponding week of September. Consignments to the Madras districts by the Great Indian Peninsula Railway have fallen to about 350 tons a day; this decrease is due not to any failure in the railway working, but to the backwardness of consignors. There are in Madras town accumulations of grain, which are estimated by the Local Government to suffice for six weeks. Despatches of grain from Madras into the interior now average about 1,100 tons a day; dealers at Bellary and Bangalore are stopping their consignments; and the Madras Government report that holders are speculating on the failure of the north-east monsoon. For the present there is no fear as to the sufficiency of the supply of grain.

4. We reported to your Lordship, in our letter quoted above, the substance of telegrams which had passed regarding the cessation of the preference shown by the Great Indian Peninsula Railway to grain consignments to the famine districts of Madras. We explained that though we were most anxious to meet the wishes of the Bombay merchants who urged a withdrawal of the preference, yet we considered that the requirements of the famine districts were of paramount importance. The Governor of Madras telegraphed on the 24th October that—

"The preference given failed to bring at present any large quantity, that the traffic was very small, and that the Madras Government therefore, although prices were still high and imports needed, did not see any objection to the Bombay order for preference being now held in abeyance."

We accordingly (on the 25th October) informed the Bombay Government by telegraph that the preference granted on the Great Indian Peninsula Railway in favour of grain consignments to the famine districts, might cease for the present; and we at the same time explained that the north-east monsoon had not yet burst at Madras, and that therefore the withdrawal of the preference could not as yet be final and permanent.

5. The combined result of the revised relief rules,† and of the favourable change of the season, has been to reduce considerably the numbers in receipt of State receipt in the Madras Presidency. The numbers have been—

† See paragraph 6 of our letter, No. 38, above quoted.

For the Week ending.	On Relief Works.	On Gratuitous Relief.	Total.
29th September -	628,259	1,603,721	2,231,980
6th October -	587,228	1,531,255	2,118,483
13th ,, -	550,299	1,283,966	1,834,265
20th ,, -	484,365	1,060,034	1,544,399

The reduction during the last three weeks has thus been 687,589, or about 30 per cent. So far as we have learnt the people who have thus ceased to be recipients of relief have gone back to their homes and their fields, to the great advantage of themselves and of the country, as well as to the benefit of the public treasury. The shortening of the administrative chain in famine matters has certainly conduced to efficiency and economy in relief operations; and so far the arrangements made by the Viceroy and the Governor of Madras on the 31st August are working well, though there was at the

* A later telegram received since this letter was struck off reported that the monsoon had burst well everywhere except in Ganjam.

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first some delay in giving effect to those arrangements. Subsidiary instructions have been issued by the Government of Madras on minor points and local details outside the scope of the revised relief rules; these instructions all tend to prevent waste of public money and demoralization of the people on the one hand, while on the other they provide that people in real distress shall not be left to starve. A copy of one of the more recent of these instructions, with our letter approving its principles, will be found in Enclosure No. 1 to this letter.

Nos. 274, 286.

Madras.

6. Throughout the Bombay Presidency there has been sufficient rain; and Sir Richard Temple telegraphed (on the 21st October) that "a new form of anxiety is arising from excessive rain in "parts of Sholapore, Sattara, Kaladgi, Belgaum, and Dharwar, where fine weather is "much needed, as damage is caused by wet to autumn and winter crops." Later telegrams dated the 28th and 30th say that excessive rain continues to retard harvest and threatens to reduce the yield, and that "no favourable change has occurred in the "weather save in Sattara and Sholapore," where it is now dry.

On the whole the prospects of the autumn and winter crops throughout the Bombay Presidency continue to be good. Prices are falling, and they now range from 24 lbs. in Khandesh to 13 and 16 lbs. per rupee in Dharwar, Belgaum, and Kaladgi. The numbers in receipt of State relief were—

For the Week ending on the—	On Relief Works.	On Gratuitous Relief.	Total.
29th September - -	219,734	163,008	382,742
6th October - -	183,613	162,348	345,961
13th „ - -	119,881	152,055	271,936
20th „ - -	98,773	139,594	238,367
27th „ - -	70,617	128,307	198,924

So that during the last four weeks the reduction in the number of relief recipients has been 187,818, or about 48 per cent. The Bombay Government has from time to time issued orders providing that, while all who can leave the relief works should be encouraged to do so, destitute persons and wanderers who are unable to labour or who cannot get employment should be carefully looked after and relieved. We are satisfied that relief is not being withheld from any who are really in want.

Mysore.

7. In Mysore there has been moderate rain throughout the fortnight. The condition of the winter crops is good, and the prospects of the spring crops are most favourable. Prices have fallen, and are now quoted at 20 lbs. per rupee in Bangalore. Markets are everywhere sufficiently supplied; new grain is being brought for sale; and dealers are reducing their importations from Madras and the seaboard.

8. Detailed instructions for the administration of relief of all kinds have been drawn up, on the basis of the orders issued by the Viceroy at Bangalore on the 8th September. These instructions have been thrown into the shape of a Famine Code for Mysore copy* of which will be found as Enclosure No. 2 to this letter. The Code has been drawn up by Mr. C. A. Elliott, the Famine Commissioner, under the orders of the Chief Commissioner. It is an excellent compendium of instructions suited to the present state of affairs in Mysore; many of its provisions founded on the orders of the Government of India, will be found applicable to famine relief administration elsewhere. In our Secretary's letter (see Enclosure No. 2) acknowledging the Code, we expressed our special satisfaction with the clauses, which carefully provide for the humane treatment of those who are unable to do a full day's work, or who are in need of medical care and special food.

No. 257.

* Other copies will be sent hereafter, only one is available now.

No. 280.

9. During the past month 25 relief officers (five of whom were native officers of the Bengal Army) 20 engineers of different grades, and 34 medical subordinates have been sent to Mysore. Much has been done to systematise and improve the arrangements at relief works and relief camps, to secure the proper treatment of the suffering poor, and to prevent peculation and mismanagement.

10. Up to the latest reports, deaths, mainly due to famine, are still occurring in and near Bangalore, whither had congregated tens of thousands, for whom adequate relief was not available in their villages. The poor creatures,—who thus wander in search of charity, grow weaker and weaker, and at last die during the cold rainy nights,—mostly come from the distressed tracts in the centre and north of the province; and they are said often to pass by relief works and relief houses, where they could at once obtain relief. A special organisation has been arranged for finding these wanderers, before

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they are past recovery, and bringing them forcibly into relief hospitals and relief camps. The reported famine deaths in and round the town and cantonment of Bangalore were—

during August	20 per day.
during 1st to 10th September	41 „
during 11th to 30th September	35 „
during 1st to 13th October	26 „
during 14th to 17th October	23 „
during 18th to 20th October	16 „

The deaths in relief camps and relief hospitals were—

during August	84 per day.
during 1st to 10th September	95 „
during 11th to 30th September	70 „
during 1st to 13th October	55 „

The numbers fed in the relief camps in and around Bangalore from the 1st August up to the 10th September were about 36,000, of whom barely one sixth were permanent inmates of the camps. From the 11th September to the 30th October the average number of persons relieved at the camps was about 20,000, of whom from one half to three quarters were permanent inmates. The good done by the changes in the relief system, and by the improvement in the season, is apparent from the reduced mortality in Bangalore town and cantonments generally. The number of deaths, exclusive of reported famine deaths and of the deaths in relief hospitals, is returned at—

In Bangalore town and cantonment	884	for the month of July.
	1,185	„ „ August.
	225	„ „ September.

11. We have not yet received detailed reports, but we learn that the Famine Commissioner fears that the mortality from famine in the Tumkur district and other parts of Central Mysore has been very large. A recent telegram from the Famine Commissioner, who is still journeying through the distressed districts, informs us that the condition of the people in the north-western districts of the province is better than he had expected, and that additional relief operations there are not now needed. At Enclosure No. 3 will be found the relief reports of the province for the last three weeks. The changes in the numbers in receipt of relief has been as follows:—

During the Week ending—	On Relief Works.	On Gratuitous Relief.
15th September	53,745	208,683
22nd „	56,551	161,892
29th „	58,693	126,204
6th October	62,506	103,750
13th „	73,202	88,757
20th „	78,478	72,838

It is satisfactory that the numbers on relief works now form a much larger proportion of the total numbers in receipt of relief. The reports state that the paupers gain much in health and spirits within a few days of their being drafted from gratuitous relief at camps or kitchens to relief works.

12. Major Moncrieff, the Acting Chief Engineer of Mysore, has returned from a journey to the district of Coorg. He reports that at the present season there is no need for extensive relief works, as the coffee gardens, now and for the next three months, will furnish ample labour. His detailed report has not yet been received, but we gather that there was ground for the representations made to the Viceroy on his visit to Mysore, regarding the need for relief operations in Coorg during the summer and early autumn months.

Hyderabad.

13. There has been a heavy fall of rain in the Hyderabad country; the crops are in good condition, prices are cheaper, and relief operations are being closed. In Berar the prospects of the crops are excellent.

Central Provinces.

14. In the Central Provinces there has been some loss of the rice crop in the districts of Saugor, Damoh, and Sumbulpore, owing to the shortness of the September rainfall. But, for the rest, the prospects of the winter crops, and the progress of the spring crop sowings, are everywhere good. Immigration into Saugor from the Central India States has now ceased, and the immigrants have begun slowly to return. As yet they return in parties of only

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50 to 200 a day; and many thousands are still in Saugor and Damoh, for some of whom relief employment has to be provided.

Rajputana and Central India States.

15. Though the condition of affairs in Rajputana was very greatly improved by the rainfall reported in our letter of the 11th October, yet there were tracts where no autumn crop had been saved, and where spring crops never grow. These tracts were situate principally in Marwar and the desert States north and west of the Aravelli hills. Emigrants from these parts were reported to be still thronging Ajmere; and therefore, whilst postponing the preparation of railway work beyond the Sendra pass towards Erinpoorah, we have directed that our sanction to the prosecution of railway work in the pass shall hold good, in order that relief employment may be provided for destitute immigrants. In Central India, though the prospect of the Malwa crops is good, and though there has been further rain in Gwalior, yet there is not sufficient agricultural employment for the many thousands of immigrants, who have come into the country between Neemuch and Indore. On the representation of the agent, Sir Henry Daly, we have directed that the earthwork on the Neemuch and Rutlam section of the Central India Railway shall be commenced at both ends. In this way employment will be provided for immigrants into the Western States of Central India. But in the South-eastern States also there is need for relief to the immigrant poor, who were flocking down the great road from Agra to Indore. Though the emigrants are beginning to return home northwards, yet all have not the means of supporting themselves on their homeward journey, and deaths among them from cholera and even from hunger are reported. Goona is the only place where British officers are quartered on the whole length of road from Gwalior to Indore. The officers there have, partly from private subscriptions and partly with the help of a grant from the Madras Relief Fund, opened relief houses, and have given food and clothing to many thousands of destitute wayfarers. The Maharaja Scindiah has engaged to maintain and indeed has maintained relief houses as far as Seepree on the Indore road, and arrangements are being made for opening relief places between Seepree and Goona. The recipients of relief are subjects of native States, and the relief houses will be in Native territory. The cost of these operations ought not properly to be a charge on the British Indian taxpayer; but the relief is being given, and if the money for its cost cannot be had elsewhere, the British treasury will have to bear the charge. Effort will be made, however, to procure the necessary funds from the native States interested. For those immigrants who require relief employment near Goona, work is being commenced on a cross road from Goona to Oojein, for which funds are available in the Central India Agency budget of the current year.

North-west Provinces and the Punjab.

16. There has been no further appreciable rain in the North-west Provinces, but there has been a good fall of rain at Rawul Pindee in the Punjab, which had not shared in the rain of the second week of October. Over the whole of the North-west Provinces, the Punjab, and Oudh, preparations for the spring crop are making good progress; an unusually broad area is being sown with spring grains, and prices have fallen somewhat. We have not yet heard whether all the proposed relief works can at once be forgone. But the schemes for extensive relief works in the North-west Provinces have been laid aside, while in the Punjab no need for special relief works had been represented by the local Government.

No. 256ª. Bengal, Assam, Burmah.

17. The crop prospects are now good over Bengal and Assam. In the Bassein and Henzada districts of British Burmah, serious floods destroyed (see Enclosure No. 4) large breadths of the young rice crop. But most of the flooded lands have been or will be replanted. The latest advices from Rangoon and Moulmein show that merchants expect a very large rice crop in Burmah, and their estimate is that the exportable surplus will reach 800,000 tons.

No. 231.

18. At paragraph 3 of your Despatch No. 53, dated 26th July, it was mentioned that a further report from Dr. Lewis and Dr. D. D. Cunningham, respecting the fevers recently prevalent in Bombay and Madras, would be awaited. We have now the honour to forward (Enclosure No. 5) a short report in which these officers state their opinion that the fevers prevalent in Bombay during the earlier part of the year 1876 were of the ordinary "intermittent" and "continued" types, and were not famine fevers. They state also that, in the Madras Presidency, fevers, "so far from being exceptionally severe during the early months of 1876, were decidedly in abeyance." The mortality returns of the Madras distressed districts for the six months, November 1876 to April 1877, show that cholera and smallpox were the most prevalent diseases from December to March.

No. 275. „ 68.

19. In Enclosure No. 6 will be found copy of a telegram despatched to your Lordship on the 16th current, regarding the death rates of the Madras Presidency, also a table

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showing the reported deaths in each of the distressed districts during the six months, November 1876 to April 1877. The net result is that, in these districts, containing a population of 13¾ millions, the reported deaths of the half year were 373,993 (or 27 per thousand), being 227,123 (or 16½ per thousand) above the reported deaths of previous years for the same area and the same period, and 188,945 (or 13 per thousand) above what is believed to be the normal death rate of an Indian population. 182,114 deaths from cholera were reported during the six months; this latter number is nearly equal to the excess of the reported deaths above the supposed normal death rate. It is not possible to say how many of the excess deaths were due to famine. The Madras Government have been asked to furnish tables of the reported deaths in districts which are not distressed for the same six months, and also to send tables for subsequent months as soon as they are ready. The results which these tables may show will be reported to your Lordship. The rural registration of deaths is not as yet very complete or trustworthy anywhere, so far as our Sanitary Commissioner is able to judge (see pages 107–8 of his Annual Report for 1875); and the latest report of the Sanitary Commissioner for Madras (pages 53 et seq.) would show that the registration of deaths in that Presidency is still capable of improvement. Accordingly we have preferred not to trust to the returns of births and deaths alone, but we have proposed a partial counting of the people in the distressed districts as soon as the famine is over, so that we may ascertain approximately what the loss of population may have been. At Enclosure No. 6 will be found a circular letter in which we have issued instructions for a census of selected tracts in the famine-stricken country of Southern India. No. 277.

We have, &c.
(Signed) LYTTON, &c.

No. 289.

No. 40 of 1877.

GOVERNMENT OF INDIA.—PUBLIC WORKS DEPARTMENT.

FAMINE.

From the GOVERNMENT OF INDIA to the SECRETARY OF STATE FOR INDIA.

Simla, the 30th October 1877.

With our letter No. 27, dated the 25th June 1877, we forwarded to your Lordship papers submitted by Sir Richard Temple, describing the differences of practice between the several provinces of India in regard to the collection, suspension, and remission of the land revenue during a year of drought. We had previously decided in February that we would not interfere with the discretion of the Local Governments of Madras and Bombay in this matter; but we forwarded the papers to the Government of Madras for an expression of their views after the present crisis was over. The Madras Government has not yet had leisure, from the more pressing duties of famine relief administration, to consider and report upon those papers. Until the views of the Madras Government have been received, we shall not trouble your Lordship with any discussion of the general question whether land revenue ought to be remitted or suspended in a time of drought.

2. But, although we wait an expression of the views of the Government of Madras before submitting to your Lordship a final expression of our opinion on the important general question, we have now the honour to forward copies of papers which go far to show the need for some general ruling on the matter; while the subject of the papers has a very important bearing upon our present financial position. In Enclosure No. 1 will be found a letter from the Madras Government, forwarding a Table in which the Board of Revenue show the demands, collections, and balances of land revenue for the famine year 1876–77. It will be seen that— No. 198.

	Lakhs.
(*a.*) The land revenue current demand for the year 1876–77 was only -	355
compared with an average demand of the three previous years of	449
(*b.*) The total collections, current and arrears, for the year 1876–77 were only - - - - - - - -	278
compared with a previous average of - - - -	449
(*c.*) The actual remissions of the year 1876–77 are - - - on account of the arrear demand, no remissions having yet been granted on the current demand.	3
(*d.*) The balances of the year 1876–77 are - - - -	130
compared with a previous average of - - - -	60

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It thus appears that the deficiency in the year's* land revenue collections amount to 449 minus 278 lakhs, that is to 171 lakhs. This total is considerably in excess of previous estimates. If more than 45 lakhs out of the outstanding balance of 130 lakhs should be collected hereafter, then the deficiency on the year will be proportionately reduced; but if the arrear collections of the present year fall short of 45 lakhs, then the deficiency of the year 1876–77 will practically be increased above the total of 171 lakhs. The attention of the Madras Government has been drawn to the extreme gravity of the losses which the public treasury has, according to these figures, to bear; and we have expressed our hope that it will not sanction any avoidable sacrifice of land revenue, either by reduction of the demand or by remissions.

* July 1876 to June 1877, inclusive.

No. 237.

Nos. 279, 284.

3. In Enclosure No. 2 are papers concerning the demand, collections, and balances of land revenue in the Bombay Presidency for the same year (1876–77). It appears that in the Bombay Districts, exclusive of Sinde—

	Lakhs.
(*a.*) The land revenue current demand for the year 1866–67 was -	263
compared with an average current demand for the two previous years of - - - - - - - -	260
(*b.*) The total collections on account of the current demand of 1876–77 were, up to the 31st August - - - - - -	233½
compared with an average for previous years of - -	259
(*c.*) The remissions granted on account of the current demand were -	2
(*d.*) The balances of the year 1876–77 were - - - - -	27½
compared with an average for previous years of - -	1½

The Bombay Government report that this large proportion of the land revenue demand has been collected, even during a year of distress, without harshness or undue pressure. We have expressed our approval of these results, and our satisfaction that they should have been attained without undue pressure on the people. The results are much to the credit of the revenue officers of the Bombay Presidency. It will be remembered that the Bombay Government were in the first instance disposed to grant considerable remissions, but that they modified their orders in this respect on our forwarding Sir Richard Temple's representations of the grave but avoidable losses which a policy of heavy remissions would entail. It will be seen, moreover, from the papers forwarded with our letter of the 25th June (quoted above), that the Bombay revenue system differs from the Madras system, in that the Bombay revenue officers inquire into each ryot's claim to remission or suspension on its individual merits, while Madras revenue officers grant remissions "in block" for whole tracts, without respect to the harvests gained by or the paying power of individual ryots. The Bombay system has, so far as the experience of the past season goes, turned out to be the best for the public treasury.

Nos. 270, 272, 278, 282.

4. Enclosure No. 3 contains correspondence with the Government of the North-western Provinces respecting the extent to which suspensions of the land revenue demand should be granted during the months of November and December 1877. The Lieutenant-Governor was at first disposed to think that the greater part of the autumn instalment of land revenue (about 150 lakhs in all) would have to be suspended over the whole of the North-western Provinces and Oudh. His first letter, dated the 11th October, was, however, written before the full effect of the rain that fell all over the country between the 6th and 10th October was appreciated; and his orders to the Board of Revenue, dated the 18th October, do not authorise such extensive suspensions of the land revenue demand as we had feared might be granted. We have instructed the Lieutenant-Governor that the condition of our treasuries does not permit of any postponement of the land revenue demand beyond what may be absolutely necessary. We have pointed out that neither the terms of the land revenue settlement nor the practice of the North-Western Provinces Government in previous years of drought, nor the circumstances of the present and previous seasons, nor consideration for the well-being of the people, nor the procedure of neighbouring and similarly situated provinces, support the view that very extensive suspensions of the land revenue demand are necessary in the North-Western Provinces during the present quarter.

5. The Lieutenant-Governor of the Punjab proposes to collect the November land revenue instalment in full, and to grant suspensions, only where absolutely necessary, on the December instalment of land revenue.

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6. The papers now forwarded to your Lordship show that the loss of land revenue in the year 1876–77, on account of the drought, was—

	Lakhs.	
In the Madras Presidency - -	171	or 38 per cent.
In the Bombay Presidency - -	25½	or 10 per cent.
Total - - -	196½	

The difference is due in great part to the difference of revenue practice in the two Presidencies. In the Deccan and Southern Mahratta country the famine and the failure of crops was, if the price of food is fair index of such severity, as severe as in any part of the Madras Presidency, for in Dharwar, Kaladgi, Sholapore, and Belgaum the price of food ranged for months dearer than in any district of Madras. The land revenue in Bombay, just as in Madras, is paid by petty occupiers (ryots) direct to Government; and, so far as recent fiscal phenomena went, the condition of the Deccan ryots seemed to be poorer than that of the Madras ryots.

7. We are as yet unable to report how far the land revenue collections of the current year (1877–78) may be affected by the recent famine. Much may depend upon the north-east monsoon (autumn rains) in the south of the Madras Presidency. If the rains are favourable then we hope that the whole of the current demand and much of the balances of last year may be collected in Madras. We have (see Enclosure No. 4) drawn the attention of the Government of Madras to the need for collecting as much as possible of the land revenue of the current year, provided the season continues as favourable as during the past two months; and we have asked for an estimate of the probable collections, on account of the current and arrear demand, as soon as the prospects of the season are clearly known. No. 283.

We have, &c.
(Signed) LYTTON, &c.

No. 290.

Revenue, No. 74.

From the Secretary of State for India in Council to His Excellency the Right Honourable the Governor-General of India in Council.

India Office, London, 31st October 1877.

Para. 1. The Despatch of your Excellency's Government, dated 20th August, No. 34 of 1877, announcing that your Excellency, accompanied by Sir Alexander Arbuthnot, proposed to visit Poona, Bangalore, and Madras for the purpose of conferring with the Local Governments and the Chief Commissioner of Mysore on the condition and prospects of those territories, under the circumstances of a renewed failure of the south-west monsoon in many quarters, has been considered by me in Council. No. 164.

2. The reports which, since the date of the letter under reply, have been received by telegraph, fully establish the wisdom of the resolution to which your Excellency came.

3. I avail myself of this opportunity to express my general concurrence in the views stated in the minute of your Excellency, dated the 12th August, which forms one of the Enclosures to the Despatch under reply.

I have, &c.
(Signed) SALISBURY.

No. 291.

Revenue, No. 82.

From the Secretary of State for India in Council to the Governor-General of India in Council.

India Office, London, 8th November, 1877.

Para. 1. I have to acknowledge the receipt of your Excellency's Despatch of the 5th September, No. 33 of 1877, giving an account of your Lordship's visit to Poona, Madras, and other places, for the purpose of conferring with the Governors of Bombay and Madras, and with other high officers on the subject of the famine. No. 215.

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2. The Despatch is one of high importance, but in replying to it I am greatly embarrassed by the fact that more recent information received by telegraph has materially altered the condition of many districts through which your Lordship passed, and that therefore your observations apply in some measure to situations which have ceased to exist. It is very gratifying to me to add, that, as a rule, the prospect has considerably improved.

3. I have to express my cordial appreciation of the wisdom and public spirit which induced your Excellency to undertake this journey for the purpose of examining personally the state of the country, and of strengthening the hands of the local governments and administrations, by your sympathy and counsel, in the performance of those arduous duties which have demanded the exercise of the highest energy and judgment.

4. Your Excellency's journey extended from Simla, through Amballa, Agra, and Allyghur, to Jubbulpore; thence by Khandesh and Nassik to Poona, where you met the Governor of Bombay; thence to Bellary, before reaching which place the Resident at Hyderabad had an interview with your Lordship, and then on to Madras. On the date of the Despatch you were about to start for Bangalore.

5. Your Excellency's Despatch gives a rapid but vivid description of the condition of the territories through which you passed, and you availed yourself of the opportunity of visiting relief camps in Poona, Bellary, and Madras. It is difficult to exaggerate the advantage to the public service in all executive departments when the head of the Government thus sees for himself the terrible proportions of the evil with which he has to contend.

6. The results of your consultations with his Grace the Governor of Madras have been stated in your Despatch No. 34 of the 5th of September, to which I will give a separate reply. Two subjects are prominently dealt with in the Despatch now under reply:—

1st. The carrying powers of the railways.
2nd. Private subscriptions in aid of relief funds.

7. The anxious attention of the Governments of Madras and Bombay has been directed to the increase of the carrying powers of the railways, but it has been found almost impracticable to obtain from them the daily delivery of the number of tons which it was thought each company ought to be able to transport. Under these circumstances, application was made to me for the supply of additional engines and waggons. These indents, as modified by more recent advices, are, as your Lordship has been informed by telegraph, in process of receiving due compliance, and I trust that the railways will soon be able to meet the exigencies of the exceptional demands made on their resources.

8. With respect to private subscriptions in aid of relief funds, I understand your Lordship's view to be this. That the Government is responsible, as far as may be practicable, for the saving of life by all the available means in its power, and that for this purpose an official agency has been organized; that it is not desirable that another agency, or the same agency under another name, should be employed on the same lines in the distribution of private charity; that such an interference would only impair the efficiency of the arrangements of Government, while the subscriptions could hardly make any appreciable difference in the expenditure of the State. At the same time, your Excellency was perfectly alive to the fact that there were objects to which the efforts of private charity might well be directed, such as the extension of relief to women of the respectable classes, of aid to persons of very small fixed incomes, and to others who were struggling if possible to remain in their homes and not to resort to relief camps. Similarly, your Excellency was also of opinion that arrangements by grants to orphanages and to individuals, for the support of those children who had lost their parents through the famine, might reasonably be the work of private charity, and you had requested the Governor of Madras to consider the specific objects to which the operation of such private charity should be directed, and the agency by which it should be distributed and superintended. If I have thus interpreted rightly the views of your Excellency they have my concurrence.

9. I approve of your instructions to the Resident at Baroda to be cautious as to the opening of petty works and the commencement of gratuitous relief. The long and exceptional prosperity of the ryots in Guzerat should render the necessity for the adoption of such measures a distant contingency. Your instructions to political officers in the neighbouring States to Baroda, to urge on the Chiefs the propriety of admitting

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free passage of grain from and to tracts threatened to scarcity, were also, I consider, very judicious.

10. The condition of Mysore is a subject of great anxiety to your Excellency. You have strengthened the famine organisation in that province by the deputation of some selected officers, an arrangement which has my full approval. As it appears that the invested funds of the Mysore State, amounting to upwards of forty-six (46) lacs of rupees, have been exhausted by the famine expenditure, I sanction the grant of a loan of fifty (50) lacs, which your Excellency proposes to make in four instalments to that State.

11. The general conclusion which I draw from your Excellency's Despatch is that, terrible as is the calamity which has visited the greater part of India, it has everywhere been met with unsparing energy and devotion by the public service in all Departments, and conspicuously by your Excellency and the Governors of Madras and Bombay.

I have, &c.
(Signed) SALISBURY.

No. 292.

Revenue, No. 83.

From the Secretary of State for India in Council to the Governor-General of India in Council.

India Office, London, 8th November 1877.

Para. 1. Your Excellency's Despatch, dated 20th September, No. 35 of 1877, relative to the famine administration of the Mysore Province, and giving an account of your Lordship's visit to Coimbatoor, Coonoor, and Ootacamund, has been considered by me in Council. No. 239.

2. I regret that your Excellency should have found the administration of relief in Mysore in so unsatisfactory a condition, and I approve of the arrangements which you at once ordered for its improvement. It is gratifying to find that in 10 days, under the able superintendence of Mr. C. A. Elliott and Major Moncrieff, your Lordship was able to report that there was most satisfactory evidence of the beneficial results of the new system.

3. I consider that your Excellency acted with judgment in sanctioning a contribution of Rs. 30,000 towards the laying out and metalling of a road in the Wynad as a relief work for the numerous labourers wandering from Mysore to that district in search of employment. The sum thus advanced is hereafter to be recovered from the Mysore State, and the rest of the estimated expenditure on the road will be provided by the Madras Government and the Planters' Association. On other requests and suggestions made to your Lordship by the Wynad planters, and deputations from various municipalities, I shall await the results of your Excellency's deliberations.

4. The statements made to your Excellency as to the mineral resources of the Wynad and the adjoining country, and especially as to the auriferous character of the soil, are of high interest, and are well deserving of the attention which your Lordship proposes to devote to them.

5. I approve of your Excellency's intention to depute either Mr. Elliott or Major Moncrieff to ascertain personally the wishes of the coffee planters of Coorg on the subject of relief works, and as to the manner in which their co-operation can be most beneficially employed.

6. In the last paragraph of the Despatch under reply, your Excellency was able to give a more cheering view of the general state and prospects of the season than I have received by any previous mail, and it is a source to me of heartfelt satisfaction that subsequent communications by telegraph have shown that the improvement has been progressive.

I have, &c.
(Signed) SALISBURY.

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No. 293.

Revenue, No. 85.

From the Secretary of State for India in Council to the Governor-General of India in Council.

India Office, London, 22nd November 1877.

No. 216. Para. 1. Your Excellency's Despatch of the 5th September, No. 34 of 1877, describing the arrangements concluded for systematising the policy and strengthening the administration of State relief throughout the famine-stricken districts of the Madras Presidency, has been considered by me in Council.

2. Your Excellency, in the 4th, 5th, and 6th paragraphs of the report, states with great clearness the peculiar difficulty of the problem presented for solution. The famine in the Madras Presidency had assumed such dimensions, both actually and in prospect, as to become one of the most serious disasters with which, as your Lordship says, the Supreme Government has ever had to deal. While the executive responsibility, at least in the first instance, rested with the Local Government, the financial responsibility rested, as always, with the Government of India. The wide extent and severity of the famine rendered the duty imposed on the Supreme Government one of anxious gravity, but one of which it could not efficiently acquit itself without, in a great degree, interfering with the action of the administration which had on the spot to provide for the mitigation of the calamity.

3. It was not deemed expedient, and I think rightly, to transfer for the time the seat of the Supreme Government to the Madras Presidency, and thus to bring the executive and financial responsibilities into such immediate contact as to prevent all administrative delay. It was, therefore, necessary to devise some plan by which the Supreme Government would be justified in relaxing its control over the Local Government, and by which the action of the latter would be rendered more prompt, direct, and efficient.

4. Your Lordship first laid down in the "Gazette of India Extraordinary" the principles by which famine policy should be guided. These are briefly summed up in the 10th paragraph of the Despatch:

1st. An abstinence by Government from all measures which might interfere with the activity of private trade.

2nd. The initiation of a large scheme of public works as the essential portion of the relief system, other forms of relief being subsidiary. The large works to be under the direction and control of the Public Works Department.

3rd. All gratuitous relief to be as far as possible temporary, and all relief camps to be maintained only for receiving and supporting the starving and the infirm, and for getting them into a condition to labour.

These principles appear to me to be sound and judicious. At the time when these arrangements were being matured, I called your Lordship's attention by telegraph to the importance of guarding from undue pressure, under the piece-work system, the large numbers of those who would not, as wholly infirm, be consigned to gratuitous relief, but who had become so enfeebled by privation as to be incapable of performing the ordinary task. I find that full provision has been made against this danger.

5. Your Lordship then proceeded to arrange that the Supreme Government should be represented by a carefully selected agent. For this most important duty you nominated Major-General Kennedy, the Secretary to the Government of Bombay in the Public Works Department, who had gained great distinction by his successful superintendence of relief operations in the Bombay Presidency.

6. You then determined that, by rules passed under the India Council's Act, the Governor of Madras should take the famine business into his own hands, as was done by Lord Northbrook during the famine of 1874 in Bengal; that Collectors and executive officers should correspond with the Government on famine matters direct, and not through the Revenue Board as heretofore; and that Major-General Kennedy, acting as the accredited agent of the Government of India, should be appointed personal assistant to the Governor in all famine affairs. These measures, by which, in your Excellency's words, the Governor of Madras became virtually a dictator in famine affairs, as far as the constitution permitted such an arrangement, were settled between the Governor and yourself, and have been loyally accepted by the other members of the Madras Government.

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7. The arrangements appear to me to have been well calculated to secure the objects which your Excellency had in view. I have to communicate to you, on behalf of Her Majesty's Government, their high appreciation of the judgment with which your policy has been conceived, and the energy with which it has been carried into execution.

I have, &c.
(Signed) SALISBURY.

No. 294.

Revenue, No. 86.

From the SECRETARY OF STATE FOR INDIA IN COUNCIL to the GOVERNOR-GENERAL OF INDIA IN COUNCIL.

India Office, London, 22nd November 1877.

Para. 1. Your Excellency's ~~Despatch of the~~ 27th ~~September~~, No. 37 of 1877, which gives a concluding account of your visit to the famine-stricken districts in Southern India, has been considered by me in Council. No. 253.

2. The great improvement which a reformed system of superintendence had in a few days introduced into the Bangalore and Kolar districts of Mysore is highly satisfactory. I share your Lordship's regret that a delay has occurred in the manifestation of a similar improvement in the districts of Madras; but I trust that the new code of instructions drawn up by his Grace the Governor, with the assistance of General Kennedy, for the guidance of officers engaged in famine relief will at once lead to the introduction of the necessary reforms.

3. I have read with attention the correspondence alluded to in the 8th paragraph of the Despatch under reply, relative to the plan of operations proposed for adoption by the General Relief Committee at Madras, and I am of opinion that, under all the circumstances, your Excellency was justified in giving your sanction to the issue of a notification directing local officers to give their best assistance to the Committee. The matter is one of considerable difficulty, but I do not doubt the Government of Madras will be able to indicate the objects to which the operations of the Committee can be directed, without interfering with the general action of the Government, and without imposing too heavy a burden on the Revenue establishments.

4. At the date of the Despatch your Excellency had completed your tour, and expected to arrive at Simla on the following day. Your Lordship places on record your obligations to several high officers for assistance given during the exceptional work which has engaged your personal attention, and it is a source of sincere gratification to me to state my opinion that, in the performance of this arduous duty, your Excellency has rendered a real and important service to the State.

I have, &c.
(Signed) SALISBURY.

No. 295.

Revenue, No. 88.

From the SECRETARY OF STATE FOR INDIA IN COUNCIL to the GOVERNOR-GENERAL OF INDIA IN COUNCIL.

India Office, London, 29th November 1877.

Para. 1. The Despatch of your Excellency in Council, dated 11th October, No. 38 of 1877, reporting on the present condition and prospects of the various provinces in India either affected or threatened with famine, has been considered by me in Council. No. 271.

2. The Despatch passes rapidly in review the situation in Madras, Bombay, Mysore, the Nizam's Country, the Central Provinces, Rajputana, and Central India States, the North-west Provinces, the Punjab, and Bengal.

3. The substance of the statements relative to all the provinces is the same, "general improvement." The calamity with which India has been visited will leave traces which may for some time cause anxiety and involve further expenditure, but I think I may now, without presumption, entertain the hope that the crisis of the famine has passed, and congratulate your Excellency's Government on the improved prospects before you.

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4. I approve generally of the orders which have been issued under your Lordship's direction, as reported in the Despatch under reply, in relation to the present state of affairs. But I take for granted that, if the favourable anticipations as to the future are realized, your Excellency will avail yourself of the earliest opportunity to reduce the extra establishments which you have found it necessary to create. I trust that the precautions now taken by the Madras Government may have the effect of checking the peculation which, I regret to be informed by your Government, has been practised by many subordinate Native officials, and in some localities have been the cause of great mortality.

5. I note with satisfaction the testimony borne by your Excellency to the good services rendered by the Honourable Sir Alexander Arbuthnot and the Honourable Mr. Hope.

I have, &c.
(Signed) SALISBURY.

No. 296.

Revenue, No. 98.

From the SECRETARY OF STATE FOR INDIA IN COUNCIL to the GOVERNOR GENERAL OF INDIA IN COUNCIL.

India Office, London, 27th December 1877.

No. 288. Para. 1. The Despatch of your Excellency in Council, dated 30th October, No. 39 of 1877, giving a further account of the condition and prospects of the provinces in India which have suffered from or have been threatened by famine, has been considered by me in Council.

2. The statements submitted in the Despatch are generally favourable. In Madras the north-east monsoon has broken in all the districts except Coimbatore, Salem, North Arcot, Ganjam, Vizagapatam, and Godavery. The early crops have greatly revived, and a yield to the extent of more than half a full harvest is expected. The winter crops are in good condition, and cultivation and sowings for the spring crops are making satisfactory progress. Prices have fallen, and the numbers gratuitously fed and employed on relief works have decreased during the month of October from 2,231,980 to 1,544,399, a fall of 30 per cent. Efficiency and economy have been secured by the shortening of the chain of administration, and the arrangements made by your Lordship in consultation with the Governor of Madras at the end of August have been attended with success.

3. In Bombay a sufficiency of rain has fallen, but in Sholapore, Sattara, Kaludji, Belgaum, and Dharwar, more than a sufficiency, which has caused some damage to the autumn and winter crops; at the date of the Despatch improvement had been manifested in Sattara and Sholapore, and the general prospects of the crops continued to be good. Prices had fallen, and the numbers on relief works and on gratuitous relief had decreased from 382,742 to 198,924, a decrease of 48 per cent.

4. In Mysore, moderate rain had fallen, the condition of the winter crops was good, and the prospects of the spring crops favourable. Prices had fallen, and the markets were sufficiently supplied. The Famine Code, drawn up by Mr. C. A. Elliot, is a compendium of instructions which will be of permanent value.

5. The statement of the mortality in and around Bangalore is a very melancholy record, but it is satisfactory to notice that the improvement in the season and the changes in the relief system had led to a large diminution in the number of deaths during the past month. The numbers gratuitously fed had fallen from 208,683 to 72,838, while the constant drafting from this class to that on the relief works had increased, the latter from 53,745 in the middle of September to 78,478 on the 20th of October.

6. In Hyderabad the crops were in good condition, prices cheaper, and the relief operations closed.

7. In the Central Provinces there had been some loss of rice crop in Saugor, Dumah, and Sambulpore on account of the deficient supply of rain in September. In the other districts the prospects of winter crops were good, and the preparations for the spring crops were in satisfactory progress.

8. In Rajputana and the Central Indian States the general situation was greatly improved by the rainfall in the middle of October. But there were parts, principally

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in Marwar, in which the autumn crops had not been saved, and where spring crops never grow; for the relief of emigrants from these parts into Ajmere, railway work had been provided. Similar relief employment had been arranged for immigrants into the Western States of Central India. I note with pleasure that his Highness the Maharajah Scindiah had opened relief houses on the Indore road as far as Seepree.

9. In the North-West Provinces, the Punjab, and Oude preparations for the spring crops were in active progress, and prices had fallen. In the Punjab no necessity for special relief works had been suggested, and in the North-West Provinces all schemes for extensive works had been abandoned. In Bengal, Assam, and British Burmah the crop prospects were very favourable.

10. I am glad to understand that, in the opinion of Doctors Lewis and Cunningham, the fevers prevalent in Bombay in 1876 were of the ordinary "intermittent" and "continued" types, and were not "famine" fevers, and that during the same period in Madras, fever, far from being exceptionally severe, was decidedly in abeyance.

11. I approve, in conclusion, of the resolution of your Excellency in Council to have a partial counting of the people in the distressed districts of Madras as soon as the famine is over, in order approximately to ascertain what the loss of the population may have been.

I have, &c.
(Signed) SALISBURY.

No. 297.

Revenue, No. 99.

From the SECRETARY OF STATE FOR INDIA to the GOVERNOR-GENERAL OF INDIA IN COUNCIL.

India Office, London, 27th December 1877.

Para. 1. The Despatch of your Excellency in Council, dated 30th October, No. 40 of 1877, relative to the suspensions on remissions of Revenue demands in the year 1876-77, has been considered by me in Council. No. 289.

2. I approve of the orders of your Lordship in Council to the Local Governments in connexion with this subject, but I will reserve the expression of my own views on the general question until the information for which you have called is before me.

3. I cannot, however, withhold the expression of my satisfaction that in Bombay so large a portion of the land revenue due has been collected at such a time, and still more, that it has been collected, as stated by the Government of Bombay, without any harshness or undue pressure. This result is highly creditable to the revenue officers, European and Native.

I have, &c.
(Signed) SALISBURY.

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Copy of a Despatch from the Secretary of State for India to the Governor-General of India in Council, dated 10th January 1878, No. 2 (Revenue), on the subject of the recent Famine in Western and Southern India.

Presented to both Houses of Parliament by Command of Her Majesty.

Revenue, No. 2.

To His Excellency the Right Honourable the Governor-General of India in Council.

India Office, London, January 10, 1878.

Para 1. I have, on more than one occasion, expressed to your Excellency, on behalf of Her Majesty's Government, their sense of the ability and devotion with which you and the officers serving under you have exerted yourselves to mitigate the calamities of the recent famine. The intensity of the visitation, the vast region which has been affected, the imperfect means of communication, the passive character of the population, the peculiarity of the languages, and the consequent loss of the services of many of the most competent and most trusted officers who, in the north of India, would have been available, have all contributed to impose a task of almost unexampled difficulty on the Governments whose duty it became to save the people from starvation. The energy and the unsparing labour with which, during so many months, the Governors of the afflicted provinces, and the officers acting under their authority, devoted themselves to their arduous duties, are worthy of the highest commendation.

2. Your own personal interposition at the more critical period of the famine rendered assistance of the utmost value to the local authorities, not only of Madras, but still more of Mysore, in organizing an efficient and economical system of relief, and your exertions probably bore fruit in a great saving of human life.

3. It is not easy to ascertain with precision in what cases these praiseworthy efforts were rewarded with complete success, or how far they were defeated. The evidence which has been offered upon this subject is conflicting, and is evidently based more upon estimate than upon accurate knowledge. Scientific questions of much interest have been at issue in respect to the operations of relief, and have probably coloured some of the extreme views which have been expressed upon this point. The simultaneous appearance of epidemic diseases, especially of cholera in a visitation of unusual severity, has lent an additional and formidable element of uncertainty to the information we possess in respect to the famine mortality of the past year; for it appears that deaths from cholera and from want are often attended by symptoms sufficiently similar to mislead an untrained observer. At the same time the datum from which all calculations of increased mortality must proceed is in a great measure wanting. The registration of deaths in Southern India is of recent introduction; and a comparison of the alleged proportion of mortality to population during the last few years with the known mortality of healthier countries is sufficient to show that the registration has been very imperfect, and that the number of deaths in those years must have been seriously understated. Where the normal mortality is not certainly known, it is hopeless to attempt to calculate the amount of an abnormal increase; and as the organisation for famine relief would cause a more careful observation of mortality, it cannot be assumed that the causes of error which have vitiated the statistics of ordinary years would operate with equal force on the year of famine.

4. I am not of opinion that any useful result would be obtained by instituting a special inquiry into this point, even if there were the slightest hope that trustworthy statistics could be collected as to the mortality due to famine alone. There seems to be little doubt that it was almost, if not entirely, averted in Bombay, and that it has been terribly severe in Mysore. I have more than once joined with your Excellency in recognizing the wisdom of the principles on which the Bombay Government acted, and the vigour with which they were carried out; and I fear that my concurrence cannot

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be withheld from the unfavourable notice taken by your Excellency of the management of some of the officers who were responsible in Mysore during the earlier period of the famine. The brunt of the calamity fell upon Madras, and in this Presidency the success of the efforts made to combat it must, from the causes to which I have adverted, remain in great uncertainty. But no uncertainty exists as to the unflagging and self-sacrificing energy with which the Duke of Buckingham and all the officers under his authority applied themselves to the discharge of their tremendous responsibilities. Nor were these exertions confined to those who belonged to the administration of the Presidency. I have already had occasion to record my acknowledgments, which I now gladly renew, of the conspicuous and enlightened services rendered in dealing with the famine difficulties of Madras, during the earlier period by Sir Richard Temple, during the later period by Major-General Sir M. Kennedy.

5. There are other questions, however, which have been raised in connexion with this famine which cannot properly be dismissed without further investigation. Some points in the actual administration of relief were during the past few months the subject of warm controversy, while some others, which have reference either to the prevention of future famines or to the mitigation of the sufferings they cause, are still anxiously debated. It is desirable that the opportunity should not be lost of investigating these by the light of the experience which has been recently acquired. It must be for some time doubtful how far the meteorological phenomena of the last twelve years are to be taken as a fair sample of the climate of India. But in any case it is evident that the protection of the people of India from the effects of the uncertainty of the seasons will constitute in the future no inconsiderable portion of the work of the Government. It is, therefore, a duty to collect with the utmost care all information which may assist future administrators in the task of limiting the range or mitigating the intensity of those calamities.

6. A Commission, constituted of three or five of the most competent persons your Excellency is able to select, will be the most suitable instrument for conducting this investigation. It should consist of men who have not taken any active part in the labours or controversies of the past year, and it is desirable that it should include at least one Native Commissioner. It should enter upon its labours as soon as the local authorities have been released by the return of normal conditions from the pressing duties of relief.

7. I will indicate some of the points upon which difference of opinion has arisen, and in respect to which, therefore, the collection of evidence, and the expression of an independent and authoritative opinion would be valuable. But, in doing so, I must not be understood to be limiting the scope of any inquiries which the Commission under your instructions may think it desirable to pursue.

8. One of the earliest points upon which discussion arose was the size and class of relief works which it was expedient to encourage. At the outset of the famine Sir Philip Wodehouse came to the conclusion that a few large works, giving employment to considerable numbers of men, and conducted under the officers of the Public Works Department, were preferable to a multitude of petty village works, conducted under the revenue officers of each district. In the first instance the Government of India, not having fully before it evidence of the aggravated character of the scarcity, declined to authorise the larger works to the extent which Sir Philip Wodehouse had desired. Shortly after this decision, your Excellency, on returning from the frontier, and Sir John Strachey, arriving from England, had the opportunity of conferring at Bombay with the Government of that Presidency, and the result of your inquiries was to lead you to accept substantially Sir P. Wodehouse's view, and to give your preference to the system of large works. In other parts of India during the remaining period of the famine you insisted upon this view, and one of the reasons which led you to visit the famine districts in Madras and Mysore was to supervise a stricter and more general organization of the same policy. I have already fully approved of your Excellency's proceedings in this respect, and do not doubt that you exercised a wise discretion. It is desirable, however, that for guidance in future famines the experience obtained of the working of the two systems should be ascertained and recorded. The relative value of the work done for the same wage in each case, the effect of the larger works in discouraging peculation and the relief of applicants not in want, and the extent to which the distance of relief-works can without undue hardship be used as a test of destitution, are the points upon which evidence is required.

There has been, at the same time, a danger against which it has been necessary to guard, and to which you have not been insensible. In works conducted under the superintendence of public works officers, it is evident that a full day's work is more

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likely to be exacted in return for a day's wage, than in the petty village works, over which there is no skilled supervision, and which are devised rather as an excuse for relief than for the public advantages which, when finished, they will confer. But this more vigilant economy carries with it a corresponding peril in those cases likely, when a famine is much prolonged, to be numerous—where the labourer is too much reduced by privation to perform a full day's work, but is not so completely enfeebled as to be fitted only for gratuitous relief. It will be a matter of much interest to learn how far the precautions taken by your Excellency and the Governor of Madras to avert this danger have, in the result, been successful.

9. Your Excellency in Council from the first insisted that the task of distributing grain throughout the famine area should be left to the unrestricted operations of trade. Under the principle you prescribed, no grain was imported by Government, with the exception of that which had been purchased by the Madras Government during the earliest weeks of the distress. The energies of private trade were in no case unequal to the task that was thus laid upon them. The high price which the trader was able to charge for grain undoubtedly imposed a heavy outlay on the Government in the administration of relief. But the cost would have been far heavier if, by importations of its own, the Government had paralysed private trade, and assumed the duty of replacing it through the vast area affected by the drought. The course which you took appeared to me to be judicious at the time, and has been fully justified by the result. It would be desirable, however, for future guidance that the details of the process of supply should, as far as possible, be placed on record. The cause to which the extreme prices of some localities were due, how far they were produced by deficient transport, how far by retardation of supply at the port of importation, are questions deserving the attention of the Commissioners. The experience of famine relief hitherto obtained in India would seem to show that the rule observed by your Excellency is sound under ordinary circumstances, but that there are contingencies under which it cannot be sustained, especially where communications are liable to sudden interruption by the weather. In the Madras famine it appears to have been highly successful; in the Bengal famine a considerable deviation from it was found to be necessary; and its too rigid observance in the Orissa famine led to a great calamity. A careful examination, therefore, into the circumstances of its application during the past distress will be of material utility.

10. Another question which occupied the anxious attention, both of your Government and that of Madras, during the earlier stages of the famine, was the amount and quality of food which is necessary to sustain a Native of Southern India in a condition fit for labour. A warm controversy arose among the medical advisers of the three Governments, in which the question was argued to a great extent upon theoretic grounds, and upon analogies derived from the experience of soldiers and convicts. This method of investigation led to no satisfactory conclusion, though possibly at the time no other was fully available. The experience of the past year will, if sufficient breadth and variety of evidence be collected, render it possible to arrive at a definite conclusion upon this vital point.

11. I have no wish to confine the investigations of the Commissioners to those points in the experience of the past famine which I have indicated above. There may be other points in respect to which your Excellency's Government, after consultation with the Government of Madras, may think that inquiry would be desirable, and might produce useful results. But an inquiry into the best system of famine-relief will not be the whole, or the most important, part of their duty. It is of still more essential importance to ascertain how far it is possible for Government by its action to diminish the severity of famines, or to place the people in a better condition for enduring them.

12. Works of irrigation are naturally the most effective remedy for a deficiency of rainfall, and no doubt can be entertained of the benefit they confer wherever they can be had without excessive cost, and where there is a permanent and sufficient supply of water to sustain them. The Government of India has spent and is still spending very large sums in the construction of them. More than 16 millions sterling have already been laid out, and the works which are in course of construction, or which have been sanctioned, will, before they are completed, have cost 6,373,000*l.* more. The financial results of these undertakings have varied remarkably. The earlier works, especially those which have been constructed in the localities already selected for that purpose by the earlier rulers of the country, have been singularly profitable. According to estimates now before me, the Eastern Jumna Canal has yielded 36 per cent., and the Western Jumna 27 per cent., no account, however, being taken of the value of the

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work which had been done by former rulers, or of the cost which has still to be incurred before these undertakings are complete. The irrigation works in the low countries of the Madras Presidency have also produced large returns. The Cauvery Delta, one of the earliest English works, is stated to have yielded 86 per cent., the Godavery Delta 21 per cent., and the Kistna Delta 15 per cent. But more recent undertakings have been very much less successful, and some, in a financial point of view, have completely failed. The Orissa Canal system, and the Madras Irrigation Company's Canal, stretching over a length of 749 miles, and costing together more than 3,000,000*l*., have not only returned nothing for the money laid out upon them, but have not, up to this year, paid their working expenses. The aggregate amount of interest which has been paid by Government on account of the capital sunk on these two undertakings has been 1,400,000*l*., making the total sum lost 4,400,000*l*. The greatest number of acres irrigated by the Orissa Canal in any one year up to the close of 1876–77 has been 94,777, by the Madras Company's Canal, 94,945. This unfortunate result is due, in some degree, to the refusal of the ryots in the vicinity of these canals to avail themselves of the water offered to them. The cause of their reluctance is imperfectly ascertained, but it probably arises from the fact that in ordinary years they enjoy sufficient rainfall to conduct their traditional methods of cultivation.

13. From the experience that has already been gained, and from the calculations furnished to you by your engineers, it is probable that the localities suited for profitable irrigation are very limited in area, and that the list of canals which the Government can undertake without loss cannot be largely extended. Great caution, therefore, in authorising the commencement of new works will be necessary, and it will be prudent to scrutinize rigorously the grounds on which, in any instance, hopes of a remunerative yield are founded. In view, however, of the frequent famines of recent years, it must be admitted that the value of an irrigation project is not absolutely negatived by the proof that it will not yield full interest on its cost. The case is conceivable that a canal which paid little or no interest in ordinary years, might in a famine year protect so large a population as to repay to Government the cost of its construction by savings in relief expenditure. The essential matter is to ascertain how far irrigation works are practicable which shall be capable of giving protection against famine in a degree at all corresponding to their cost.

14. Very much stress has been laid, from time to time, upon the financial and other advantages to be derived from expenditure on these works, and during the past autumn the construction of them in the Madras Presidency upon a vast scale has been strenuously urged. The fact that demands of this kind have recently been made by persons of authority would of itself suffice to make a searching investigation of the question highly expedient. If there is room by such undertakings materially to relieve the Madras people from so much suffering, and the Indian Treasury from an intolerable burden, the construction of the works ought to be commenced with the least possible delay. If, on the other hand, this resource is not to any great extent available, and any such undertaking, on the contemplated scale, would only impose fresh burdens on the taxpayers without effecting any notable diminution of the evil, it is of high importance that the evidence of that fact should be set forth with sufficient fullness and cogency to dissipate all illusion upon the subject. In the reports which your Excellency has forwarded me from time to time, I find much to lead me to believe that the very cause which produced the famine in many cases has made irrigation works wholly or partially ineffective. The same want of rain which parched the fields, emptied the tanks, and lessened the volume of the rivers. The absence of glaciers in the hills of Southern India would naturally render the irrigation canals far more liable to be affected by want of rain than similar works in the valleys of the Ganges and the Indus. Sir R. Temple, in his Minute of the 15th of April, gives a description of the effect of the drought upon these channels even before the south-west monsoon had failed, which seems to indicate that want of water will probably be a fatal obstacle to any large extension of irrigation.

15. The drought in Madras, he says, "caused the Kistna and its affluents to roll "down in such a diminished volume that the canal from the Toongabhadra near "Kurnool and the great irrigation works of the Masulipatam Delta were stinted in "their supply. It made the freshes and floods of the Penair descend in such "shrunken proportions that the reservoir and channels of Nellore were nearly deprived "of water. It stopped the supply of the Cauverypauk Lake near Arcot, and ren-"dered the dam across the Palar inoperative. It rested for some time on the districts "of South Arcot, Tanjor, and Trichinopoli, and threatened them with evil; they

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"were, however, saved, South Arcot mainly by some later rains, and Tanjor and "Trichinopoli partly by the same rains, but chiefly by the canals. Though "it failed to dry up the harvest of the rich tracts of Malabar and Travancore, or "to prevent the Cauvery from filling the canals of the Tanjor Delta, yet it "rendered them powerless to send the succour that might otherwise have been "expected."

Of the whole cultivated area in the famine districts "a small part (technically "termed 'wet') is watered from artificial tanks, which often rise to the proportions "of lakes; the remainder (technically called 'dry') is watered in some parts from "wells, but for the most part from rainfall. The proportion of wet lands varies "greatly in the several districts, being largest in Chingleput, where it exceeds one "half of the whole cultivation, and smallest in Bellary, where it is only one twentieth. "The failure was worst in the 'wet' lands. The tanks, having their catchment areas "in undulating plains or low hills on which but little rain descended, were left almost "dry. What are usually splendid sheets of water became scorched dusty plains, "appearing as huge black patches, with cracked and fissured soil. The sluices, the "distributing channels, and all the apparatus of irrigation lay useless."

16. It will be one of the most important tasks of the Commission to ascertain how far this failure extended; what was the condition, for the purposes of irrigation, during this drought, of the canals, the tanks, and the wells in the famine districts; to what extent they performed the function of protecting the population against famine; and to estimate, as far as possible, the amount of saving thus effected in the cost of Government relief. They should also report upon the measures which may, in their judgment, be practicable for extending a similar protection to portions of the population of Madras or Bombay who do not now enjoy it, either by the improvement of existing works or the construction of new works. In particular, it would be desirable that they should ascertain the feasibility, both in respect to physical and to financial conditions, of Sir R. Temple's suggestion, that tanks should be made capable of containing, and retaining, a two years' supply of water.

17. The opinion has been expressed that the practical effect of the tenure which is most largely prevalent in the Madras Presidency is to disincline the tenant from expending his labour or his money on the excavation of wells. Any general inquiry into the merits or demerits of the ryotwari system would in itself be too onerous an extension of the labours of the Commission, and would be, to a great extent, superfluous, as the controversy which was conducted for so long a time upon that subject has furnished as ample materials for the formation of a judgment on the general question as are likely to be obtained. But it would be expedient to collect opinions upon the single point, whether there is, owing to the prevalent tenure, any such uncertainty in the mind of a ryot as to his immediate prospects as to discourage him from digging or deepening wells where otherwise it would be his interest to do so.

18. There are grounds for believing that, in many cases, minor irrigation works depending upon the flow of small streams have been allowed to become ineffective, owing to the continued neglect of the inhabitants to keep the channels open. To a similar but more prolonged neglect is probably due the fact, often adverted to, that tanks provided in many parts of Southern India in the times of former rulers have been suffered to fall into decay. It will be a matter worthy of consideration, whether a legal power of imposing upon the inhabitants that duty should not be vested in the executive government.

19. It appears from the report of Mr. Boswell, the Collector of Admednagar in the year 1875, that three irrigation works, on which the Government had spent the sum of 62,729*l.*, in that district, had been practically useless, because the ryots had been too poor, too inextricably involved in debt, and apparently too hopeless of realising any independent profit from irrigation to be willing to prepare their land for the distribution of the water. It would be important to know whether, in any of the famine districts of Madras, the efficacy of the irrigation works which have been constructed by the Government has been materially hindered by any similar obstacle.

20. The value of railways as an assurance to the population against the worst sufferings of famine has been singularly illustrated during the past year. Without their aid it would have been wholly impossible to convey sufficient grain to the inland districts. Their resources, however, were strained to the utmost, and at one time a serious apprehension was entertained that they would be overtasked. How far it will be possible, with a due regard for financial considerations, to bring a wider range of country within their immediate reach is a question which will doubtless occupy your

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earnest attention at an early period. Much information bearing upon this question, and calculated to assist you in forming a decision upon it, will be collected in the course of the proposed inquiry. It will be of especial interest to estimate the enhancement of price due, in the more remote localities, to the necessity of long carriage by road, and the extent to which, if they had been more accessible by railway, the natural competition of trade would have diminished both the expense falling upon the Government, and the sufferings to which all classes were exposed from the dearness of the provisions before the time had arrived when they were compelled to become applicants for Government relief.

21. I have indicated the principal matters in respect to which the proposed Commission may gather facts and make recommendations which will assist the Government in devising measures to protect the people from the calamities following upon excessive drought. But nothing that I have written must be held to preclude them from pursuing any inquiries which, in their judgment, are calculated to attain this object.

I have the honour to be,
My Lord,
Your Lordship's most obedient humble servant,
(Signed) SALISBURY.

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Printers to the Queen's most Excellent Majesty.
For Her Majesty's Stationery Office.

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EAST INDIA (FAMINE).

RETURN to an Address of the Honourable The House of Commons, dated 18 July 1878;—*for*,

COPY

OF

PAPERS

RELATING TO THE

PARTIAL CENSUS

IN

THE FAMINE STRICKEN DISTRICTS

OF

INDIA,

To which is added an EXTRACT from a DESPATCH from the GOVERNMENT of INDIA relative to the SCARCITY prevailing at the present time in the NORTH WEST PROVINCES.

India Office,
18 July 1878.

EDWARD STANHOPE,
Under Secretary of State.

(*Mr. Edward Stanhope.*)

Ordered, by The House of Commons, *to be Printed*,
18 *July* 1878.

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COPIES of PAPERS relating to the MORTALITY during the late FAMINE in SOUTHERN INDIA.

(No. 46, of 1878.)

Government of India.—Public Works Department.

FAMINE.

To the Right Honourable Lord *Cranbrook*, Her Majesty's Secretary of State for India.

My Lord, Simla, 18 April 1878.

ADVERTING to paragraph 19 of our letter to your Lordship's predecessor, No. 39, dated the 30th October last, we have the honour to forward tables furnished by the Government of Madras, showing the mortality from various causes in all the districts of the Presidency from May to October 1877. We append an abstract of the tables. It will be observed that during these six months the number of deaths registered in the nine distressed districts alluded to in our telegram of the 16th October, and noted in the margin, were as follows:—

Nellore. Chingleput (including Madras Town). Madura. Kurnool. Cuddapah. Bellary. North Arcot. Salem. Coimbatore.

In May - - - - - - - - -	71,307
„ June - - - - - - - -	73,202
„ July - - - - - - - -	94,048
„ August - - - - - - - -	118,978
„ September - - - - - - - -	112,034
„ October - - - - - - - -	81,451

making a total number of 551,020. Adding this figure to the total of the previous six months (*i. e.*, from November 1876 to April 1877), the deaths during 12 months in the nine districts were 925,103, or 67 per mille per annum, on the total population of 13,765,165. The deaths reported in the year 1875 were 340,545, or 25 per mille, showing an excess mortality in the above-mentioned 12 months of 584,468.

2. The partial counting of the people in selected areas of the famine country, which we reported as having been arranged, has been effected by the Madras and Bombay Governments and the Chief Commissioner of Mysore.

3. From Madras his Excellency the Governor has reported to us by telegraph the results of the counting. They are as follows:—

"Famine census taken 15th March gives following results, omitting decimals—percentages are on population 1871 plus five years normal annual increase at 1½ per cent.:—Gooty taluq, Bellary district, houses minus one per cent., population minus 20 per cent.; Nandikotkur, Kurnool, houses plus 5, population minus 26; Madanpali, Cuddapah, houses plus 12, population minus 25; Gudur, Nellore, houses unchanged, population minus 20; Palladam, Coimbatore, houses minus 2, population minus 16; Pouneri, Chingleput, houses plus 2, population minus 10; in non-famine districts Gudivada, Kistna, houses plus 39, population plus 5; Museri, Trichinopoly, houses unchanged, population minus 2; Mayaveram, Tanjore, houses plus 6, population plus 1; Ambasamudram, Tinnevelly, houses minus 1, population minus 1; returns for entire district Salem not quite tabulated."

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4. From Mysore the Famine Commissioner reports that the results of the partial census when generalised, and compared with the results of the census of 1871, show a decrease in population of 1¼ millions. Generalising, for the six districts marginally noted, from the results of the selected areas of the Madras Presidency, we find the difference between present figures and those of 1871 to be 759,000, while in Kistna, Tanjore, Trichinopoly, and Tinnevelly, the results exceed the number of 1871. These results are attained without reckoning any normal yearly increase of population since the census of 1871. The loss of 759,000 is due to mortality, to decrease in births, of which comparatively few were registered in the famine year, and also to emigration. For, as reported in paragraph 14 of our letter No. 45 of this day's date, the Madras Government informs us that "many persons who fled the scarcity are still in Ceylon and elsewhere, and many have not returned yet to their homes from remote districts of the Presidency, whither they have wandered for work or sustenance."

Bellary. Nellore. Kurnool. Coimbatore. Cuddapah. Chingleput.

5. It will be noticed that the results of the Salem district have not been furnished yet. When complete figures for the Madras Presidency and Mysore shall have been received, further report shall be submitted to your Lordship. We shall then be in a position to report also the results of the Bombay Presidency which have not reached us yet, but which have been promised to us at an early date.

We have, &c.
(signed) *Lytton.*
F. P. Haines.
A. J. Arbuthnot.
A. Clarke.
J. Strachey.
E. B. Johnson.
W. Stokes.

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ABSTRACT of Death Return of Distressed Districts of the Madras Presidency for the Twelve Months from November 1876 to October 1877.

DISTRICTS.	Population.	MONTHLY MORTALITY.												Total.
		November 1876.	December 1876.	January 1877.	February 1877.	March 1877.	April 1877.	May 1877.	June 1877.	July 1877.	August 1877.	September 1877.	October 1877.	
Nellore	1,376,811	2,660	5,644	11,142	7,352	3,639	2,768	2,642	3,019	2,738	4,725	5,506	4,918	—
Madras	397,552	1,165	2,034	3,743	4,401	5,021	4,078	4,038	3,676	4,626	4,241	3,472	3,192	—
Chingleput	938,184	1,752	2,865	6,094	4,351	4,136	2,990	3,625	4,558	8,904	9,339	6,862	4,197	—
Madura	1,328,231	1,975	2,861	3,758	2,580	3,030	3,006	5,257	5,091	7,184	9,782	10,921	10,037	—
Kurnool	959,640	3,057	11,862	6,253	5,247	5,127	5,264	5,405	4,676	6,767	8,482	7,840	8,465	—
Cuddapah	1,351,194	3,298	6,612	13,360	11,431	7,685	6,602	7,864	8,440	10,344	11,872	9,242	7,773	—
Bellary	1,668,006	4,923	7,440	9,361	12,965	14,006	10,040	10,271	12,079	7,035	16,728	15,150	11,234	—
North Arcot	2,015,278	3,736	6,046	13,686	12,169	9,622	6,477	8,183	9,330	17,439	19,737	17,534	15,120	—
Salem	1,966,995	3,507	7,038	10,258	10,416	12,947	11,963	15,260	14,177	19,956	21,852	21,112	16,515	—
Coimbatore	1,763,274	2,321	4,323	5,017	5,835	5,112	6,029	8,762	7,556	9,055	12,220	14,395	—	—
Totals	13,765,165	28,394	56,725	82,672	76,747	70,328	59,217	71,307	73,202	94,048	118,978	112,034	81,451	925,103

ABSTRACT of Death Return of the Districts of the Madras Presidency from November 1876 to October 1877.

FAMINE DISTRICTS.

DISTRICTS.	Population.	Number of Registered Deaths.	Proportion per 1,000 of Deaths to Population.
Nellore	1,376,811	56,753	41
Madras	397,552	43,690	110
Chingleput	938,184	59,673	64
Madura	1,328,231	65,482	49
Kurnool	959,640	78,445	81
Cuddepah	1,351,194	104,523	78
Bellary	1,668,006	131,832	79
North Arcot	2,015,278	139,079	69
Salem	1,966,995	165,001	84
Coimbatore	1,763,274	80,625*	46
Total	13,765,165	925,103	67

NON-FAMINE DISTRICTS.

DISTRICTS.	Population.	Number of Registered Deaths.	Proportion per 1,000 of Deaths to Population.
South Arcot	1,755,817	78,279	44
Tinnevelly	1,693,959	62,249	37
Trichinopoly	1,200,408	58,655	49
Tanjore	1,973,731	67,420	34
Ganjam	1,520,088	17,130	11
Vizagapatam	2,610,839	27,622	11
Godavery	1,592,939	35,900	23
Kistna	1,452,374	36,291	25
Nilgiris	49,501	3,197	60
South Canara	918,362	28,535	32
Malabar	2,261,250	47,907	21
Total	17,029,268	463,185	27

* For eleven months.

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(No. 50 of 1878.)

From the Government of India to the Secretary of State for India.

My Lord, Simla, 10 June 1878.

THE Government of Bombay, in their Despatch, No. 5, of the 22nd April, furnished your Lordship with tables and memoranda, showing the results of the partial census taken in selected tracts of the famine districts of that Presidency. We now have the honour to forward a table showing the results of the partial census taken in certain districts and talooks of the Madras Presidency. Sir Michael Kennedy, Personal Assistant to his Grace the Governor of Madras, has prepared a memorandum on the figures shown in the Madras table, and a copy of that memorandum will be found in the enclosures to the present letter.

2. We submit, for your Lordship's information, copy of a resolution, in which we have reviewed the results of the partial census in both Presidencies. We cannot avoid the conclusion that there has been a most deplorable diminution of the population in parts of Southern India during the past two years. But we consider that the papers now before us do not furnish means for forming a correct estimate of the famine mortality over the whole of the famine-stricken and partially distressed areas.

We have, &c.

(signed) *Lytton.*
Frederick Haines.
Alexander J. Arbuthnot.
John Strachey.
W. Stokes.
Rivers Thompson.

(No. 1299.)

EXTRACT from the PROCEEDINGS of the Government of India, Famine Department, dated Simla, 8 June 1878.

FAMINE.

Read—Letter No. 955, dated 16th April 1878, from the Bombay Government, forwarding, with remarks, tables showing the results of the partial census taken on the 19th January 1878, in parts of five districts, where the famine of 1876-77 had been most severe.

Read—A table showing the results of the partial census taken on the 15th March in parts of 11 districts of the Madras Presidency, and over the whole of the district of Salem.

Read also—A memorandum by Lieutenant General Sir Michael Kennedy, K.C.S.I., Personal Assistant to his Grace the Governor of Madras, commenting on the results of the partial census in Madras.

RESOLUTION.

In order to ascertain how far the population of Southern India had been reduced by the famine of 1876–77, it was decided that a partial census should be taken of selected tracts in the districts where the pressure of the famine had been most severe. It was believed that the actual loss of population could not be known with certainty, until one or two favourable seasons had passed, until emigrants had returned, and until a simultaneous census of the whole country could be taken. But it was desirable to know what the present (and in part perhaps temporary) loss of population had been in the worst tracts.

2. In

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2. In the Bombay Presidency nine districts had been afflicted more or less severely by famine. In each of the five districts which had suffered most severely, two talooks were selected; one of the two was the talook which had shown the highest death-rate during the year 1877, and the other was a talook which had shown a death-rate equal to the average of the district during that year. In these 10 talooks a census was taken on the 19th January 1878; no inquiry was made whether the missing people had died, or had emigrated, during the famine; the men, women, and children were counted, and the totals were compared with those of the regular census of February 1872. The results were as follows:—

DISTRICT.	Total Population as per Census of		Difference.	Percentage on Original Population.
	1872.	1878.		
Sholapore (2 talooks) - - - -	166,941	143,957	—22,984	minus 13
Sattara (2 „) - - - -	144,148	128,354	—15,794	„ 11
Kaladgi (2 „) - - - -	224,473	187,666	—36,807	„ 16
Belgaum (2 „) - - - -	246,181	226,358	—19,823	„ 8
Dharwar (2 „) - - - -	152,602	148,537	— 4,065	„ 2
TOTAL (10 talooks) - - -	934,345	834,872	—99,473	„ 10⅔

The memoranda which accompany the Bombay census tables show that the apparent diminution of population has been much greater in the case of the male than in the case of the female population. In some talooks the decrease among the males was nearly double the decrease among females. It is known* that considerable migration took place from the Deccan and Southern Mahratta Country into the Konkan and into South Canara. It is conjectured that men and boys would emigrate in larger numbers than women and girls; and this excess diminution of the male population is held to contribute further evidence that a part of the diminution of population, ascertained at the recent census, must have been due to emigration.

3. The Bombay Government sums up the results of the partial census by saying, that the question of mortality from famine is still left very much in the same doubtful state as before; that the partial census of the worst or most distressed tracts shows some diminution in the population; that the diminution is partly apparent, as arising from emigration, and partly real, as arising from mortality; that the mortality arose partly from sickness, extending not only throughout the year 1877, but throughout the two previous years 1875 and 1876, and partly from famine; and that the mortality arising from famine itself cannot be exactly estimated.

4. The partial census in the famine districts of Madras was taken, on the 15th March 1878, in one talook out of each of the six severely stricken districts of Bellary, Kurnool, Cuddapah, Nellore, Coimbatore, and Chingleput, and in all the nine talooks which constitute the district of Salem; a census was also taken in one talook out of each of the districts of Kistna, Trichinopoly and Tinnevelly, in parts of which some distress was felt, but in parts of which the crops were saved by irrigation, and in one talook of Tanjore, throughout almost the

* NOTE.—As an instance of the emigration which took place from the Deccan may be cited the case of the Indapore talook of Poona. An experienced survey officer, in November 1876, was deputed by the Government of Bombay to inquire into the condition of every village in this talook. The Bombay Government, when reviewing the report made by this officer, recorded that out of a total population of 66,937, as many as 40,289 had temporarily emigrated by the month of November 1876, that is to say, at the very beginning of the scarcity. It was explained that the emigrants had gone to the hill ranges of Poona, to Khandesh, and the Nizam's territory.

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the whole of which the crops were saved by irrigation from the Cauvery river. The results of the census were as follows:—

In the	Population as per Census of		Difference.	Percentage of Difference on Original Population.
	November 1871.	March 1878.		
Six talooks of the six very distressed districts	859,132	739,989	— 119,143	minus 13
Nine talooks of the Salem district - -	1,977,034	1,559,896	— 417,138	„ 21
Three talooks of the three slightly distressed districts.	496,702	528,574	+ 31,872	plus 6
One talook of the Tanjore district - -	221,749	242,999	+ 21,250	„ 9

5. No review of these figures has yet been received from the Madras Government; but Sir Michael Kennedy has furnished the Government of India with remarks upon the results of the partial census. He considers that the diminution of the population must be due to the effect of migration, of increased mortality, of diminished births; or to a combination of all these three causes. No figures, even approximate, are available to show the extent to which emigration has taken place from the famine districts. The number of emigrants by sea from the Madras Presidency to Burmah, Ceylon, and elsewhere, is shown by the returns from sea-ports to have been 287,482 during the 14 months of famine, as compared with 156,143, the average number for a corresponding period in ordinary times; that is to say, the emigration by sea nearly doubled during the famine. But there is nothing to show how many of these emigrants came from the famine districts, or from the particular talooks in which the recent census was taken. Again, there is no available information regarding the great exodus of population from the famine districts to the neighbouring tracts in Malabar, Tanjore, Ganjam, and parts of Tinnevelly and Kistna, where drought had comparatively little effect. The figures of the recent census show that the diminution among the males of 10 years old and upwards has been considerably greater than among women of the same age. Sir Michael Kennedy points out that there was no reason why men should have died from famine more rapidly than women, while it is quite probable that men would migrate more readily than women. He considers that this excessive diminution among men tends to show that the total number of persons migrating from the famine tracts must have been very large, and that a part at any rate of the decrease of population must be due to emigration. He shows that a part of the diminution must be due to the decrease in births; for the returns (confessedly imperfect as yet) of births for the 15 famine talooks, in which the census has now been taken, give a decrease of 32,054 births as compared with the average of ordinary years. Further, he shows that, according to the monthly returns of mortality, a great part of the loss of population was due to unusual epidemics of cholera, small-pox, and fever, which swept off, in these 15 talooks, 149,053 persons, compared with an average mortality of 32,909 from these diseases as returned during the years 1870–75.

6. The table, cited in the preamble to this Resolution, regarding the results of the partial census in Madras, takes the normal increment of the population to be 1½ per cent. per annum; and some of the subsidiary statements forwarded by the Government of Bombay assume the normal increase of the population to be 1 per cent. per annum. If it be assumed that any such increase really occurred during the years 1872—75 before the distress began, then the actual loss of population attributable to famine will be proportionately larger. Sir Michael Kennedy, in his memorandum, shows that the excess of registered births over registered deaths, according to the returns published by the Madras Government, gave a normal increase of population at the rate of ·2 per cent. per annum in the 15 talooks during the period 1872—76; and he considers that there is no sufficient ground for the assumption that the population of the Madras

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Madras Presidency increases at the rate of 1½ per cent. per annum. It appears to the Government of India that no absolute certainty has yet been attained regarding the normal increase of population in India. The Madras Census Report of December 1873 shows (pp. 11—13) that, according to four censuses taken from 1851 to 1871, the annual rate of increase ranged from 0·74 per cent. during the earliest to 3·02 per cent. during the latest period. But the writer of the Report (Dr. Cornish) rejects these deduced rates of increase, and holds that the figures merely prove the earlier censuses to have been imperfect. In the North Western Provinces a detailed census has been taken on scientific principles more often than in other parts of India. The Report of the 1871 census for the North Western Provinces shows (page 2 of Vol. I. of the Report) the annual increase of population to have been 0·52 per cent., as compared with an increase in Great Britain of 0·56 during the 10 years, 1851—1861. The Census Report of the Bombay Presidency of January 1874 (pp. 72–74 and 236–237) shows the deduced rate of increase in the population to be 0·54 per cent. per annum. Probably, until the information on this subject is more complete, the normal increase of an Indian population might be taken at between 0·5 and 0·6 per cent. At this rate the population would double itself within 130 years. As pointed out by the Bombay Government, parts of the country were afflicted by epidemic diseases during 1875 and 1876, and during those years the supposed normal rate of increase may not have been maintained; but during the years 1872—1875, or four years, some increase of the population must, it may be believed, have occurred. And the apparent, as well as the actual loss of population, during these two sad years of famine, must be proportionately increased above the figures shown or suggested in the foregoing paragraphs of this Resolution.

7. His Excellency the Governor General in Council deduces from the figures now reviewed that there has been a lamentable decrease of the population, during the two past seasons, in the selected famine-stricken tracts where the partial census has recently been taken. But there is still much uncertainty as to the numbers who have migrated, and who may return to their homes. The figures for the several talooks, both in the Bombay and in the Madras Presidency, show remarkable differences between the per-centages of apparent loss of population; and it is not possible to say over what proportion of the famine country the higher, the medium, or the lower per-centages of decrease in the population extend. His Excellency the Viceroy in Council considers, therefore, that the Papers now before the Government of India do not furnish means for forming a correct estimate of the famine mortality in Southern India during 1876—78. Copies of all the Papers will be furnished to the Famine Commission for their consideration.

(True Extract.)

(signed) *C. Bernard,*
Additional Secretary to the Government of India.

COPY of the foregoing Resolution, together with the Papers read, forwarded to the Secretary to the famine Commission.

(signed) *C. Bernard,*
Additional Secretary to the Government of India.

From *J. H. Garstin*, Esq., Additional Secretary to the Government of Madras (Famine), to the Additional Secretary to the Government of India, Public Works Department (Famine), (No. 1257), dated Ootacamund, the 1st June 1878.

I HAVE the honour to forward herewith the returns of the trial census taken in accordance with the directions of the Government of India contained in your letter of the 17th October 1877, No. 944.

2. I am to point out that, although this Government in their letter of the

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15th November 1877, No. 328, indicated doubts as to the value of any results to be so obtained, they determined to give the fullest effect to the wishes of the Government of India, and decided to select in addition to certain talooks in famine districts, one entire famine district and some talooks of districts the least affected by the famine pressure. They were of opinion that isolated talooks would be liable to be affected by so many special or local causes, that the results would be more than ordinarily unreliable.

* Bellary	Gooty.
Kurnool	Nandikotkur.
Cuddapah	Madanapalli.
Nellore	Gudur.
Coimbatore	Palladam.
Chingleput	Ponneri.
† Kistna	Gudivada.
Trichinopoly	Museri.
Tanjore	Magaveram.
Tinnevelly	Ambasamudrum.

3. The marginally noted six talooks* of the famine districts, and the marginally noted four talooks† in the districts least affected by scarcity and drought, and also the entire district of Salem, were accordingly selected for the trial census. The enclosed statement gives the result, showing the comparative numbers of houses and of population, and the per-centage of diminution and increase as compared with the census of 1871.

4. The accuracy of the registration is too open to doubt to allow of any safe opinion being formed as to the existence of any, and what, normal increase in the period between the census of 1871 and the close of 1875, but I am directed to enclose a statement showing the registration of births and deaths for that period in the talooks under reference and carried on to the end of February 1878. From this it will be seen that the registered deaths were in excess of the registered births in the remaining portion of 1871, subsequent to the census, in the talooks of—

Tripatore	Salem.
Uttengiri	Salem.
Madanapalli	Cuddapah.
Gudur	Nellore.
Palladam	Coimbatore.
Ambasamudrum	Tinnevelly.

In the year 1872 in—

Tripatore	Salem.
Gudur	Nellore.

In 1873 in—

Salem	Salem.
Namkal	Salem.
Trichengode	Salem.
Tripatore	Salem.
Uttengiri	Salem.
Nandikotkur	Kurnool.
Gudur	Nellore.
Ponneri	Chingleput.

In 1874 in—

Tripatore	Salem.
Uttengiri	Salem.
Nandikotkur	Kurnool.
Madnapalli	Cuddapah.
Gudur	Nellore.
Ponneri	Chingleput.

In 1875 in—

Oossoor	Salem.
Tripatore	Salem.
Uttengiri	Salem.
Madanapalli	Cuddapah.
Gudur	Nellore.
Palladum	Coimbatore.
Ambasamudrum	Tinnevelly.

while in 1873 the same was the case in the entire district of Salem by 5,843.

5. The statement also shows the large increase in the number of deaths registered in the famine period of 1876-77. Of the deaths which occurred during that period, 149,053 were returned in the year 1877 as due to cholera, small-pox

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small-pox and fever, this detailed information not being available for 1876. It is, however, impossible to say how far cholera, fever, or many other ailments may have been influenced by the sufferings of famine, or by the use of unaccustomed or unwholesome food, arising from the famine pressure, and it is equally impossible to ascertain how far the loss of the population shown by the trial census in the selected talooks may be partly due to emigration, which by sea alone is known to have increased from about 98,000 in 1875-76 to 198,000 in 1876-77, or to migration which has been very extensive through all the affected districts.

6. The Government have referred these returns, together with a memorandum by Sir M. Kennedy, to the Sanitary Commissioner, and his report thereon will be forwarded.

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STATEMENT showing the Results of the partial CENSUS of 1878 in the undermentioned selected Taluqs, as 1872 to 1876, and after certain necessary Additions and Deductions have been made (on account of the

DISTRICTS.	TALUQS.	NUMBER OF VILLAGES.			NUMBER OF HOUSES.				POPULATION		
									MALES.		
		Inhabited.	Uninhabited.	TOTAL.	According to Census of 1878.	According to Census of 1871.	Difference between Columns 6 and 7.	Percentage of Increase or Decrease.	Above 10 Years of Age.	10 Years of Age and under.	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	
Salem	Salem	594	42	636	65,405	95,364	—29,959	— 31·4	106,805	48,395	1
	Athur	184	10	194	30,387	29,755	+ 632	+ 2·1	49,392	24,394	2
	Namkal	515	59	574	66,027	76,082	—10,055	— 13·2	72,004	35,226	3
	Trichengode	575	23	598	56,990	66,765	— 9,775	— 14·6	58,225	27,421	4
	Oossoor	768	172	940	39,773	45,257	— 5,484	— 12·1	48,134	18,728	5
	Kistnagiri	513	99	612	33,092	32,236	+ 856	+ 2·6	39,991	20,860	6
	Darampuri	558	182	740	36,024	42,771	— 6,747	— 15·7	46,087	22,807	7
	Tripatore	419	29	448	35,265	41,823	— 6,558	— 15·6	53,896	27,026	8
	Uttengiri	449	119	568	35,641	41,995	— 6,354	— 15·1	39,621	16,876	9
	TOTAL	4,575	735	5,310	398,604	472,048	—73,444	— 15·5	514,155	242,333	10
Bellary	Gooty	154	4	158	23,979	27,241	— 3,262	— 11·9	43,380	18,309	11
Kurnool	Nandikotkur	101		101	20,297	19,273	+ 1,024	+ 5·3	30,009	11,011	12
Cuddapah	Madanapalli	95	10	105	28,844	25,712	+ 3,132	+ 12·1	38,290	16,447	13
Nellore	Gudur	205	5	210	25,280	25,194	+ 86	+ ·3	44,471	16,760	14
Coimbatore	Palladam	191	3	194	59,006	60,429	— 1,423	— 2·3	67,955	33,591	15
Chingleput	Ponneri	242	17	259	16,910	16,537	+ 373	+ 2·4	34,257	16,860	16
Kistna	Gudivada	206	40	246	21,103	15,084	+ 6,019	+ 39·8	34,215	17,259	17
Trichinopoly	Museri	224	10	234	56,393	56,176	+ 217	+ ·4	87,650	42,948	18
Tanjore	Magaveram	344	7	351	42,486	39,853	+ 2,633	+ 6·6	83,317	37,179	19
Tinnevelly	Ambasamudrum	89	39	128	39,168	39,927	— 759	— 1·9	51,740	24,984	20
TOTAL of the Six Famine Taluqs, other than those of the District of Salem		988	39	1,027	174,316	174,386	— 70	— ·04	258,362	112,978	21
TOTAL of Salem		4,575	735	5,310	398,604	472,048	—73,444	—15·5	514,155	242,333	22
GRAND TOTAL of 15 Famine Taluqs		5,563	774	6,337	572,920	646,434	—73,514	—12·9	772,517	355,311	23

NOTE.

Athur.—One village has been added to Athur since 1871. The population of this village in 1871 is not ascertainable, as the village cannot be identified. The population now entered, has, therefore, been deducted from the totals in both Columns 16 and 17.

Tripatore.—To this taluq one village was added from North Arcot subsequently to 1871, and three were transferred from it to South Arcot. The necessary deductions have been made from the totals entered in Column 17.

Coimbatore.—Since the Census of 1871, two villages in the Palladam taluq were amalgamated into one, while two were added to the taluq (one from Collegal, and another from Darampuri), and one was transferred to Darampuri. In the Census figures of 1871, the populations of two villages were not included, their schedules not having been forthcoming. These have now been taken into account, and on this account, and on account of the transfer of villages above explained, the total given in Column 17 for this taluq does not coincide exactly with the total for the taluq as given in the published Census return for 1871.

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compared with the CENSUS of 1871, plus an Increment of 1½ per Cent. per Annum, during the Five Years, from Transfer of certain Villages from one Taluq to another) in order to render the Comparison correct. .

	ACCORDING TO CENSUS OF 1878.					POPULATION OF 1871, PLUS THE INCREMENT.			Difference between Columns 16 and 19.	Percentage of Increase or Decrease.	Difference between Columns 16 and 17.	Percentage of Increase or Decrease.
	FEMALES.		TOTAL.			Population according to Census of 1871.	Increment of 1½ per Cent. per Annum from 1872 to 1876.	TOTAL.				
	Above 10 Years of Age.	10 Years of Age and under.	Males.	Females.	TOTAL.							
	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.
1	114,735	47,521	155,200	162,256	317,456	403,892	31,218	435,110	—117,654	— 27·0	— 86,436	— 21·3
2	55,061	24,942	73,786	80,003	153,789	162,630	12,572	175,202	— 21,413	— 12·2	— 8,841	— 5·4
3	81,555	34,952	107,230	116,507	223,737	273,382	21,133	294,515	— 70,778	— 24·0	— 49,645	— 18·2
4	60,171	27,362	85,646	87,533	173,179	246,986	19,089	266,075	— 92,896	— 34·9	— 73,807	— 29·8
5	51,651	18,968	66,862	70,619	137,481	189,068	14,616	203,684	— 66,203	— 32·5	— 51,587	— 27·3
6	44,078	21,085	60,851	65,163	126,014	170,249	13,159	183,408	— 57,394	— 31·3	— 44,235	— 25·9
7	51,601	22,926	68,894	74,527	143,421	187,312	14,480	201,792	— 58,371	— 28·8	— 43,891	— 23·4
8	59,782	27,095	81,522	86,877	168,399	192,946	14,913	207,859	— 39,460	— 18·9	— 24,547	— 12·7
9	43,093	16,830	56,497	59,923	116,420	150,569	11,638	162,207	— 45,787	— 28·2	— 34,149	— 22·6
10	561,727	241,681	756,488	803,408	1,559,896	1,977,034	152,818	2,129,852	—569,956	— 26·8	—417,138	— 21·1
11	42,139	17,802	61,689	59,941	121,630	142,716	11,029	153,745	— 32,115	— 20·9	— 21,086	— 14·7
12	30,210	10,415	41,020	40,625	81,645	103,783	8,023	111,806	— 30,161	— 26·9	— 22,138	— 21·3
13	37,633	15,809	54,737	53,442	108,179	134,546	10,400	144,946	— 36,767	— 25·4	— 26,367	— 19·5
14	42,933	16,200	61,231	59,133	120,364	142,257	10,996	153,253	— 32,889	— 21·4	— 21,893	— 15·4
15	72,942	33,223	101,546	106,165	207,711	232,155	17,942	250,097	— 42,386	— 16·9	— 24,444	— 10·5
16	33,389	15,954	51,117	49,343	100,460	103,675	8,015	111,690	— 11,230	— 10·0	— 3,215	— 3·1
17	33,549	16,769	51,474	50,318	101,792	89,900	6,948	96,848	+ 4,944	+ 5·1	+ 11,892	+ 13·2
18	95,291	40,758	130,598	136,049	266,647	255,132	19,722	274,854	— 8,207	— 2·9	+ 11,515	+ 4·5
19	85,907	36,596	120,496	122,503	242,999	221,749	17,138	238,887	+ 4,112	+ 1·7	+ 21,250	+ 9·5
20	57,973	25,438	76,724	83,411	160,135	151,670	11,725	163,395	— 3,260	— 1·9	+ 8,465	+ 5·5
21	259,246	109,403	371,340	368,649	739,989	859,132	66,405	925,537	—185,548	— 20·6	—119,143	— 16·1
22	561,727	241,681	756,488	803,408	1,559,896	1,977,034	152,818	2,129,852	—569,956	— 26·8	—417,138	— 21·1
23	820,973	351,084	1,127,828	1,172,057	2,299,885	2,836,166	219,223	3,055,389	—755,504	— 32·8	—536,281	— 23·3

NOTE.

Chingleput.—Three villages were added to the Ponneri taluq from Trivellore subsequent to 1871. The population of these villages has been included in the figures given in Columns 16 and 17 for this taluq.

Tinnevelly.—Thirteen villages of the Ambasamudrum taluq were transferred to other taluqs, and one was added to it, since 1871. The population of the added village in 1871 is not ascertainable, as the village cannot be identified. The population now returned has therefore been deducted from the totals in both Columns 16 and 17.

Nellore.—One village was transferred from the Gudur to the Nellore taluq. The population of that village in 1871 has been deducted from the total in Column 17.

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MEMORANDUM on the partial CENSUS in MADRAS DISTRICTS taken in March 1878.

THE partial census of 1878 was taken in the Madras Presidency over the whole of the nine taluqs of the district of Salem; in six taluqs of other districts, which have been afflicted with famine; and in four taluqs of districts, where failure of crops did not prevail, or only prevailed to a very limited extent.

2. The result has been that in Salem the returns show an apparent loss of population, as compared with the actual numbers of the census of 1871, of 417,138; in the other six famine taluqs, a loss of 119,143; and in the non-famine taluqs, the returns show a gain of 53,122. The total apparent loss for the 15* famine taluqs amounts, therefore, to 536,281.

* Nine of Salem and six others.

3. In recording the result of the census, an annual increase of 1½ per cent., or 7½ per cent. for the five years ending 1876, has been allowed for, and this raises the apparent loss as follows:—

	Rs.
In Salem to - - - - - - - - - -	569,956
In the six other famine taluqs - - - - -	185,548
	755,504
While the four non-famine taluqs, instead of a gain show a loss of - - - - - - - - - -	2,411

4. This assumed increment has been termed the "normal annual increase," but it is not shown on what grounds it has been assumed.

5. As far as my judgment goes there has been no such increase, and my reasons for arriving at this conclusion are as follow:—

General Considerations.

6. Southern India has enjoyed peace and tranquillity for many years, during which the increase of population up to the limit of the sustaining power of the soil has been unchecked, except by occasional seasons of scarcity, more or less partial and localised, and by periodical outbreaks of epidemic diseases.

7. In the dry tracts, of which the 15 taluqs under reference form a part, the soil is generally poor. Under the most favourable conditions as to season, but also under a rude and primitive system of agriculture, it produces comparatively light crops of food grains, sufficient only for the bare subsistence of a limited number of persons whose wants are few, whose habits are simple, and whose life is passed in laboriously wringing from the soil its scanty produce. No large areas of arable land have, of late years, been available for increased cultivation; and, under the circumstances, it is probable that, in these tracts, so little favoured by nature, the limits of increase of production and of population have been reached, and that the land, under the rude system of cultivation prevailing, now supports, and has for some years past supported, as large a population as can draw a subsistence from it.

8. It is probable that there may have been some amount of aggregation in the larger towns and villages, and, to a trifling extent, emigration to more favoured districts may have taken place; but, as regards the great mass of the purely agricultural population of the famine tracts, the general considerations are, I think, opposed to any considerable increase, since the date of the last census in 1871.

Register of Births and Deaths.

9. The total number of births registered since the census of 1871, up to the end of 1876, was 404,392, while the total number of deaths during the same period was 375,212. This shows an apparent increment, in five years and two months, of 29,180 on a population of 2,836,166, or, in other words, the population appears to have been increasing at the very slow rate of ·2 per cent. per annum. This result is, however, subject to the reliability of the registering, the correctness of which is doubtful. The errors may be either way;

See Statements (A.) and (B.) accompanying (pages 18, 19).

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way; but taking the figures as they stand, they lead to the inference that, under normal circumstances, and allowing for a similar increase in 1877, the population of the 15 famine taluqs in March 1878 might have been expected to be as below:—

2,836,166—Census population of 1871.
29,180—Actual difference between births and deaths to end of 1876.
6,000—Normal difference between births and deaths for 14 months (*i.e.*, 12 months of 1877 and two months of 1878).

2,871,346—Total.

Comparative Number of Houses.

10. A comparison of the number of houses shown by the census of 1871 and that of 1878 leads to the inference that the population of the 15 taluqs, so far from having increased, has actually diminished. There were found in 1878 * 73,514 fewer houses than were returned in 1871, and allowing four persons per house (the proportion shown by the census numbers), this would indicate a decrease in the population of 294,056. I do not desire to push this argument too far, or beyond what it may be worth; but it may be urged that an estimate of the increase or decrease of a population based upon the increase or decrease in the number of houses, would be roughly reliable; and it is a fact that, of the 15 taluqs, where a decrease of population is found, nine show a decrease of houses; while of the four taluqs, where there is an increase of population, three show also an increase of houses. Moreover, the social tendencies of the people, and the facilities afforded by law for the division of properties, are in favour of an increase of houses; and it may be fairly urged that, even with a stationary population, the number of separate houses would increase.

* See Census Return.

11. Without, therefore, insisting too much on the results indicated by the decrease in houses, it may be sufficient to observe that the apparent fact that they have decreased is directly opposed to the assumed increment in the number of the people.

12. For the above reasons, I think that there is no sufficient ground for assuming a "normal increase" of the population, since the census of 1871, amounting to 1½ per cent. per annum. There may have even been an actual decrease *since* 1871; but I will now proceed on the assumption (*see* paragraph 9 *ante*) that there has been an increase not exceeding 2 per cent.

13. The population residing in the 15 taluqs being, according to the census of 1878, 2,299,885, instead of 2,871,346, as it should have been, on the assumptions made in paragraph 9, there is a difference of 571,461 to be accounted for.

14. This difference must be due to the effects of migration, of increased mortality, of diminished births, or to a combination of all these causes.

15. As regards the question of migration, it is greatly to be regretted that for the 15 taluqs under notice no figures even approximate are available.† Statements of emigration from the different ports ‡ show that the emigrants were very much in excess of the numbers in ordinary years; but how many of these persons belonged to the coast districts, and how many to taluqs similarly situated to those under review, it is impossible to say, while there are no figures whatever showing the extent of inland migration. There can, however, be no doubt, for it is a well-recognised fact, that the migration from the famine to the more favoured districts was very large; how large it is impracticable to determine, but the following figures may throw some light on the subject:—

† Accompanying Statement (E). page 21.

‡ These returns for 14 months, viz., from 1st October 1876 to 30th November 1877, show an increase of 131,339 in the number of emigrants, the average being 156,143, and the actuals being 287,482. The number of emigrants, therefore, nearly doubled.

16. According to the census of 1878, the number of

Males of 10 years and under is - - -	355,311
Females of 10 years and under is - -	351,084

while the number of

Males above 10 years is - - - -	772,517
Females above 10 years is - - - -	820,973

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It appears, therefore, that while the males under 10 years were 4,000 in excess of the females, the men were 48,000 less in number than the women. Now there appears to be no reason why more men than women should die from famine or other causes, but there are many obvious reasons why more men than women should migrate.

17. The conclusion is, therefore, fair, that whatever the number of migrants may be, the men exceed the women by at least 48,000.

18. It follows, then, that the number of migrants must be very large, or such an excess of men over women would be impossible; and, supposing the migrant boys and girls to be about equal in number, it would seem a very liberal estimate to assume that the migrant males are 33 per cent. in excess of the migrant females.

19. Under this assumption, the total number of migrants would be about 350,000, *i. e.*, males 200,000, and females 150,000.

20. Adding this number of probable absentees, most of whom may return, to the census population of 1878, we obtain a total of 2,649,885, leaving (*see* paragraph 9) 221,461 persons to be accounted for.

21. The birth and death returns* of the 15 taluqs since the commencement of the famine to the end of February 1878, show a mortality in excess of the average, amounting to 190,814, and a decreased birth-rate compared with the average, amounting to 32,025, that is to say, these returns would lead to the probability of a diminution in the population of 222,839, a result tallying with the numbers shown in the preceding paragraph as still to be accounted for.

* *See* Statement (D.).

	Excess Mortality.	Decrease of Births.
In 1876 - - - -	3,890	+ 57
In 1877 - - - -	181,027	— 26,394
In 1878 to end of February	5,897	— 5,688
TOTAL - -	190,814	— 32,025

22. As regards the excess death-rate of 190,814, shown by the Sanitary Commissioner's mortality returns, the greater part is, no doubt, due to the unfortunate prevalence of cholera, small-pox, and fever, which were by no means confined to the poorer classes, during the famine period. The death-rate in the 15 taluqs from these causes amounted to 149,053 in 1877 alone,† as compared with an average of 32,909 for the six years ending 1875. The excess deaths in 1877 from these causes may, therefore, be set down at 116,000, which, deducted from 181,000, the total excess deaths of that year, leaves 65,000 excess deaths due to other causes.

† *See* Statement (A.) and Abstract (C.), which show the deaths as below:—

	1877.	Average for 1870–71–72–73–74–75.
Cholera - - -	62,230	2,655
Small-pox - -	13,504	3,105
Fevers - - -	73,319	27,149
TOTAL - -	149,053	32,909

Figures for the comparison of the mortality from these causes in the famine months of 1876 and 1878 are not available; but the deaths were probably in much the same proportion.

23. These diseases, then, account for nearly two-thirds of the excess mortality shown by the returns.

24. As regards the diminution of births, part must, no doubt, be set down to the effect of the famine upon the reproductive powers of the community; but part, and by no means a small part, is certainly due to the migratory movements already discussed.

25. It would appear, therefore, that but for the prevalence of cholera, small-pox, and fever, the death-rate in the 15 taluqs under review would not have been very greatly in excess of the average. Assuming (*see* paragraph 23) that two-thirds of the excess deaths in 1876 and 1878 may be set down to these diseases, the whole number of excess deaths due to them will amount to 122,514, which, deducted from the total excess deaths since the commencement of the famine (190,814), will leave 68,290 to be accounted for. Regarding these, it may well be urged that a period remarkable for cholera was probably also remarkable for kindred diseases; but, taking the most unfavourable assumption, and supposing, which is scarcely possible, that all these excess deaths were due to famine, their number would amount to less than 2½ per cent. of the population.

26. This result (and it is to be remembered that it is arrived at on the very unfavourable and most unlikely assumption that all the excess deaths, not due to cholera, small-pox, and fever, are due to famine), is, no doubt, greatly to be regretted; but, considering the vast areas and lengthened periods over which the

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the famine has extended, and the helpless nature of a large portion of the population, it may be said that, on the whole, the substantial safety of the people was secured, so far as such a result was practically attainable.

27. To summarise, the conclusions arrived at in this memorandum are as follow:—

(1.) That looking to general considerations, to the records of births and deaths, and to the census results as to the number of existing houses, there has not been an increase of population since 1871 at the rate of 1½ per cent. per annum; that, in all probability, any increase that may have taken place does not exceed ·2 per cent. per annum; and that there may possibly have been a decrease of numbers.

(2.) That a large portion of the apparent loss of population shown by the last census is due to migration. What the number of absentee migrants actually was, it is not practicable to determine; but that, on a consideration of the actual number of resident males and females over 10 years of age, found in the districts, the number may fairly be assumed to be about 350,000.

(3.) That cholera, small-pox, and fever account for nearly two-thirds of the excess mortality during the period between the latter part of 1876 and the end of February 1878.

(4.) That the loss of population, not thus accounted for, amounts to about 68,290, or to less than 2½ per cent.; some, but, not all, of which loss may be attributable to the distress that has prevailed.

(signed) *M. K. Kennedy*,
Lieutenant General, R.E.

Ootacamund, 11 May 1878.

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STATEMENT furnished by the SANITARY COMMISSION[illegible]he same Period in the 19 Taluqs

NAME OF DISTRICT.	TALUQS.	1870.					1871.					1878.									
												JANUARY.					FEBRUARY.				
		Cholera.	Small-pox.	Fevers.	Total Deaths.	Total Births.	Cholera.	Small-pox.	Fevers.	Total Deaths.	Total Births.	Cholera.	Small-pox.	Fevers.	Total Deaths.	Total Births.	Cholera.	Small-pox.	Fevers.	Total Deaths.	Total Births.
Salem	Salem	822	19	2,922	6,816	6,580	445	45	3,925	6,192	6,609	86	268	489	1,238	170	80	117	437	636	142
	Athur	235	37	843	2,468	3,228	305	102	1,538	3,073	3,295	13	238	194	602	214	19	223	136	472	180
	Namkal	360	47	1,357	3,722	4,690	406	37	1,884	4,273	5,338	86	186	422	1,111	161	19	122	261	633	159
	Triehengode	305	18	1,923	3,910	5,117	580	50	2,429	4,170	5,497	–	76	315	739	94	63	58	275	536	82
	Oossoor	278	16	2,652	4,867	3,487	42	18	2,339	3,796	3,911	3	17	542	1,098	69	–	26	476	834	56
	Kistnagiri	541	31	1,432	3,273	3,685	85	9	1,484	3,122	4,528	1	25	229	598	43	2	25	319	625	41
	Darampuri	153	20	2,487	4,235	3,892	5	12	2,250	3,677	3,679	21	76	272	807	31	30	58	284	763	49
	Tripatore	598	25	925	3,334	4,396	239	11	1,813	3,819	4,552	16	120	202	564	117	3	42	183	341	88
	Uttengiri	134	13	980	2,531	3,658	43	26	1,578	3,225	3,472	–	107	163	504	32	2	160	137	514	50
	TOTAL	3,426	226	15,521	34,156	38,733	2,150	310	19,240	35,347	40,881	225	1,113	2,833	7,261	931	169	831	2,808	5,554	849
Bellary	Gooty	–	31	988	1,811	2,222	10	28	889	1,619	2,435	–	–	413	885	53	–	4	226	519	26
Kurnool	Nandikotkur	–	105	875	1,564	1,964	–	64	964	1,404	2,285	–	5	660	761	22	–	–	348	413	14
Cuddapah	Madanapalli	25	69	1 072	1,945	1,536	178	38	1,210	2,090	1,995	–	10	656	743	40	–	1	440	496	50
Nellore	Gudur	141	22	298	1,001	698	213	49	578	1,374	1,264	21	3	465	562	12	–	3	63	82	5
Coimbatore	Palladam	480	16	1,207	3,223	2,372	105	8	1,690	2,883	2,477	2	98	247	547	153	–	74	201	422	137
Chingleput	Ponneri	42	7	409	1,622	1,693	132	66	507	1,700	1,998	–	3	196	281	36	–	5	94	207	33
	TOTAL	688	250	4,849	11,166	10,485	638	253	5,838	11,070	12,404	23	119	2,577	3,759	316	–	87	1,372	2,138	267
Kistna	Gudivada	423	6	303	1,751	1,428	204	33	884	1,415	1,595	96	29	25	259	217	8	41	12	131	156
Trichinopoly	Musori	623	16	1,235	3,746	3,424	334	17	1,951	4,290	4,736	15	145	197	948	233	2	82	172	662	307
Tinnevelly	Ambasamudram	864	55	557	3,469	2,561	1,147	410	748	4,174	2,694	16	4	155	728	311	8	3	168	541	231
Tanjore	Mayaveram	353	83	598	3,693	4,618	19	390	721	4,483	5,588	73	77	95	675	514	12	81	47	498	431
	TOTAL	2,262	160	2,696	12,659	12,031	1,704	850	3,804	14,362	14,613	200	255	472	2,605	1,275	30	207	399	1,832	1,175
GRAND TOTAL		6,376	636	23,066	57,981	61,249	4,492	1,413	28,882	60,779	67,898	448	1,487	5,882	13,625	2,522	199	1,125	4,379	9,524	2,290

Ootacamund, 11 May 1878.

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(B.)

STATEMENT (B.), abstracted from STATEMENT (A.), showing the Number of DEATHS and BIRTHS from 1870 to 1876, in the Fifteen Famine Taluqs in which the CENSUS of 1878 was taken.

DISTRICTS.	TALUQS.	DEATHS.								BIRTHS.								Difference.
		In 1870.	In 1871.	In 1872.	In 1873.	In 1874.	In 1875.	In 1876.	TOTAL.	In 1870.	In 1871.	In 1872.	In 1873.	In 1874.	In 1875.	In 1876.	TOTAL.	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
Salem	Salem	6,316	6,192	5,674	7,972	6,846	7,567	8,633	49,200	6,580	6,609	7,035	7,283	8,929	8,570	9,005	54,011	+ 4,811
	Athur	2,468	3,073	3,209	4,250	3,430	4,634	3,750	24,814	3,228	3,295	3,760	5,210	5,315	4,975	5,012	30,795	+ 5,981
	Namkal	3,722	4,273	4,572	6,700	4,053	4,785	4,375	32,480	4,690	5,338	5,817	5,007	6,242	6,496	5,720	39,310	+ 6,830
	Trichengode	3,910	4,170	4,239	5,988	4,377	4,513	5,469	32,666	5,107	5,497	5,943	5,520	6,981	7,310	7,133	43,491	+ 10,825
	Oossoor	4,367	3,796	853	4,218	4,269	5,445	5,745	28,693	3,487	3,911	933	4,902	4,550	3,882	3,851	25,516	— 3,177
	Kistnagiri	3,273	3,122	2,949	3,799	3,316	3,912	4,190	24,561	3,685	4,528	5,120	4,422	4,275	3,507	4,024	29,561	+ 5,000
	Darampuri	4,235	3,677	3,235	4,684	3,842	3,786	4,239	27,698	3,892	3,679	4,961	4,814	4,276	4,540	4,741	30,903	+ 3,205
	Tripatore	3,334	3,819	4,739	6,106	4,958	5,635	4,722	33,313	4,396	4,552	4,362	3,686	4,000	3,495	4,186	28,687	— 4,626
	Uttengiri	2,531	3,225	2,770	4,108	4,446	4,209	3,675	24,964	3,658	3,472	3,245	3,535	3,849	3,072	4,282	25,113	+ 149
	TOTAL	34,156	35,347	32,240	47,825	39,537	44,486	44,798	278,389	38,723	40,881	41,176	44,379	48,417	45,847	47,954	307,387	+ 28,998
Bellary	Gooty	1,811	1,619	2,109	2,507	2,168	3,237	3,854	17,305	2,222	2,435	3,053	3,281	3,276	3,851	5,728	23,846	+ 6,541
Kurnool	Nandikotkur	1,564	1,404	2,006	1,966	2,177	1,897	3,064	14,078	1,964	2,235	2,217	1,730	2,013	2,036	2,398	14,593	+ 515
Cuddapah	Madanapalli	1,945	2,090	1,685	2,399	4,246	3,809	4,081	20,255	1,536	1,995	2,415	2,439	2,563	2,074	2,875	15,897	— 4,358
Nellore	Gudur	1,001	1,374	1,509	1,462	1,169	1,240	1,474	9,229	698	1,264	1,378	1,212	994	837	863	7,246	— 1,983
Coimbatore	Palladam	3,223	2,883	2,341	2,778	2,727	5,789	3,444	23,185	2,372	2,477	2,649	2,843	3,181	4,294	4,837	22,653	— 532
Chingleput	Ponneri	1,622	1,700	1,559	1,804	1,910	2,020	2,156	12,771	1,698	1,998	1,702	1,715	1,829	2,047	1,786	12,770	— 1
	TOTAL	11,166	11,070	11,209	12,916	14,397	17,992	18,073	96,823	10,485	12,404	13,414	13,220	13,856	15,139	18,487	97,005	+ 182
	GRAND TOTAL	45,322	46,417	43,449	60,741	53,934	62,478	62,871	375,212	49,218	53,285	54,590	57,599	62,273	60,986	66,441	404,392	+ 29,180

Ootacamund, 11 May 1878.

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(C.)

STATEMENT (C.), abstracted from STATEMENT (A.), and showing DEATHS from CHOLERA, SMALL-POX, and FEVERS, in the Fifteen Famine Taluqs in 1877, and in 1870 to 1875, both Years inclusive.

In 1877.			In 1870.			In 1871.			In 1872.			In 1873.			In 1874.			In 1875.			During the Six Years 1870 to 1875.		
Cholera.	Small-pox.	Fevers.	Cholera.	Small-pox.	Fevers.	Cholera.	Small-pox.	Fevers.	Cholera.	Small-pox.	Fevers.	Cholera.	Small-pox.	Fevers.	Cholera.	Small-pox.	Fevers.	Cholera.	Small-pox.	Fevers.	Cholera.	Small-pox.	Fevers.
62,230	13,504	73,319	4,114	476	20,370	2,788	563	25,078	574	3,653	23,758	–	8,619	31,439	–	3,981	29,792	8,454	1,336	32,459	15,930	18,628	162,896
																				AVERAGE - - -	2,655	3,105	27,149

Octacamund, 11 May 1878.

(D.)

STATEMENT (D.), showing the Excess DEATHS and Diminished BIRTHS, in the Fifteen Famine Taluqs, in 1876-77 and 1878, compiled from the Tables furnished to Government by the Sanitary Commissioner.

District.	Taluqs.	Population according to Census of 1871.	Excess Deaths in 1876.	Excess Deaths in 1877.	Excess Deaths in 1878, up to the end of February.	Total Excess Deaths.	Diminished Births in 1876.	Diminished Births in 1877.	Diminished Births in 1878, up to the end of February.	Total Diminished Births.	Sum of all Excess Deaths and Diminished Births.
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
Salem - - - - -	Salem - - - -	393,805	1,289	24,201	530	26,020	+71	3,944	847	4,720	30,740
	Athur - - - -	164,006	—14	5,531	330	5,847	+23	971	301	1,249	7,096
	Namkal - - - -	261,009	103	12,837	588	13,528	35	2,214	487	2,736	16,264
	Trichengode - - -	249,678	429	20,500	35	20,964	+80	3,831	703	4,454	25,418
	Oossoor - - - -	193,037	—67	19,031	1,093	20,057	176	2,535	459	3,170	23,227
	Kistnagiri - - -	170,223	—220	11,667	446	11,893	260	2,533	457	3,250	15,143
	Darampuri - - -	190,626	674	17,081	629	18,384	154	3,039	605	3,798	22,182
	Tripatore - - - -	190,800	—474	10,019	—105	9,440	+59	1,075	307	1,323	10,763
	Uttengiri - - - -	153,801	—13	13,086	172	13,245	+64	1,631	410	1,977	15,222
	TOTAL - - -	1,966,995	1,707	133,953	3,718	139,378	328	21,773	4,578	26,677	166,055
Bellary - - - - -	Gooty - - - -	144,568	1,574	10,169	641	12,384	+61	1,711	397	2,047	14,431
Kurnool - - - -	Nandikotkur - - -	101,866	573	11,794	772	13,139	+111	869	221	979	14,118
Cuddapah - - - -	Madanapalli - - -	135,468	135	10,684	478	11,297	+32	791	222	981	12,278
Nellore - - - - -	Gudur - - - -	147,141	101	2,761	115	2,977	172	422	45	639	3,616
Coimbatore - - - -	Paladam - - - -	237,806	—273	7,486	230	7,443	+492	10	13	+469	6,974
Chingleput - - - -	Ponneri - - - -	104,210	73	4,180	—23	4,230	139	818	214	1,171	5,401
	TOTAL - - -	2,838,056	3,890	181,027	5,931	190,848	+57	26,894	4,205	32,025	222,873

Octacamund, 11 May 1878.

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(E.)

STATEMENT showing the Number of EMIGRANTS to *Ceylon*, &c., during August 1877.

DISTRICTS.	Number of Emigrants during the Month.									Average Number during the corresponding Period of the past Three Years.								
	Ceylon.	Burmah.	Straits Settlements.	Mauritius.	Réunion.	West Indies.	Cayenne.	Natal.	TOTAL.	Ceylon.	Burmah.	Straits Settlements.	Mauritius.	Réunion.	West Indies.	Cayenne.	Natal.	TOTAL.
Ganjam - -	–	152	–	–	–	–	–	–	152	–	96	–	–	–	–	–	–	96
Vizagapatam -	–	69	–	–	–	–	–	–	69	–	45	–	–	–	–	–	–	45
Godavery - -	–	217	–	–	–	–	–	–	217	–	301	–	–	–	–	–	–	301
Kistna - - -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Nellore - -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Madras - -	–	–	–	339	–	–	–	–	339	–	–	–	147	–	117	–	–	264
South Arcot - -	–	–	–	–	–	–	–	–	–	3	–	–	–	78	*60	50	–	191
Tanjore - -	2,546	–	–	–	–	–	–	–	2,546	28	–	323	–	–	–	–	–	356
Madura - -	19,048	465	606	–	–	–	–	–	20,119	8,618	356	–	–	–	–	–	–	8,974
Tinnevelly - -	8,493	–	–	–	–	–	–	–	8,493	3,199	–	–	–	–	–	–	–	3,199
South Canara -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Malabar - -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
TOTAL - -	30,087	903	606	339	–	–	–	–	31,935	11,848	798	328	147	78	177	50	–	13,426

* Guadaloupe - - - - - - - - - - - - - - - - 26
Martinique - - - - - - - - - - - - - - - - 34
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STATEMENT showing the Number of PERSONS who returned from *Ceylon*, &c., during August 1877.

DISTRICTS.	Number of Persons who returned during the Month.									Average Number during the corresponding Period of the previous Three Years.								
	Ceylon.	Burmah.	Straits Settlements.	Mauritius.	Réunion.	West Indies.	Cayenne.	Natal.	TOTAL.	Ceylon.	Burmah.	Straits Settlements.	Mauritius.	Réunion.	West Indies.	Cayenne.	Natal.	TOTAL.
Ganjam - -	–	–	–	–	–	–	–	–	–	–	5	–	–	–	–	–	–	5
Vizagapatam -	–	284	–	–	–	–	–	–	284	–	147	–	–	–	–	–	–	147
Godavery - -	–	44	–	–	–	–	–	–	44	–	125	–	–	–	–	–	–	125
Kistna - - -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Nellore - -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Madras - -	–	–	–	–	–	393	–	–	393	–	–	–	9	–	–	–	128	137
South Arcot - -	2	–	–	–	–	–	–	–	2	3	–	–	–	–	–	–	–	3
Tanjore - -	–	–	–	–	–	–	–	–	–	11	–	–	–	–	–	–	–	11
Madura - -	2,262	–	–	–	–	–	–	–	2,262	6,137	–	–	–	–	–	–	–	6,137
Tinnevelly - -	3,412	–	–	–	–	–	–	–	3,412	1,867	–	–	–	–	–	–	–	1,867
South Canara -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Malabar - -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
TOTAL - -	5,676	328	–	–	–	393	–	–	6,397	8,018	277	–	9	–	–	–	128	8,432

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STATEMENT showing the Number of EMIGRANTS to *Ceylon*, &c., during September 1877.

DISTRICTS.	Number of Emigrants during the Month.									Average Number during the corresponding Period of the previous Three Years.								
	Ceylon.	Burmah.	Straits Settlements.	Mauritius.	Réunion.	West Indies.	Cayenne.	Natal.	TOTAL.	Ceylon.	Burmah.	Straits Settlements.	Mauritius.	Réunion.	West Indies.	Cayenne.	Natal.	TOTAL.
Ganjam - -	–	109	–	–	–	–	–	–	100	–	176	–	–	–	–	–	–	176
Vizagapatam -	–	787	–	–	–	–	–	–	787	–	719	–	–	–	–	–	–	719
Godavery - -	–	2,090	–	–	–	–	–	–	2,090	–	3,711	–	–	–	–	–	–	3,711
Kistna - - -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Nellore - -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Madras - -	–	–	–	–	–	–	–	472	472	–	–	–	–	–	–	–	–	–
South Arcot - -	–	–	–	–	–	–	–	–	–	2	–	–	–	78	*55	50	–	185
Tanjore - -	1,308	–	30	–	–	–	–	–	1,338	25	–	434	–	–	–	–	–	459
Madura - -	8,722	1,010	166	–	–	–	–	–	9,898	8,735	718	1,165	–	–	–	–	–	10,618
Tinnevelly - -	9,285	–	–	–	–	–	–	–	9,285	3,290	–	–	–	–	–	–	–	3,290
South Canara -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Malabar - -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
TOTAL - -	19,315	3,996	196	–	–	–	–	472	23,979	12,522	5,324	1,599	–	78	55	50	–	19,158

* Guadaloupe - - - - - - - - - - - - - - - 26
* Martinique - - - - - - - - - - - - - - - 29
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STATEMENT showing the Number of PERSONS who returned from *Ceylon*, &c., during September 1877.

DISTRICTS.	Number of Persons who returned during the Month.									Average Number during the corresponding Period of the previous Three Years.								
	Ceylon.	Burmah.	Straits Settlements.	Mauritius.	Réunion.	West Indies.	Cayenne.	Natal.	TOTAL.	Ceylon.	Burmah.	Straits Settlements.	Mauritius.	Réunion.	West Indies.	Cayenne.	Natal.	TOTAL.
Ganjam - -	–	–	–	–	–	–	–	–	–	–	30	–	–	–	–	–	–	30
Vizagapatam -	–	104	–	–	–	–	–	–	104	–	101	–	–	–	–	–	–	101
Godavery - -	–	110	–	–	–	–	–	–	110	–	161	–	–	–	–	–	–	161
Kistna - - -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Nellore - -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Madras - -	–	–	–	145	–	–	–	–	145	–	–	–	103	69	–	–	57	229
South Arcot - -	9	–	–	–	–	–	–	–	* 9	4	–	–	–	–	–	–	–	4
Tanjore - -	–	–	–	–	–	–	–	–	–	10	–	–	–	–	–	–	–	10
Madura - -	2,330	–	–	–	–	–	–	–	2,330	5,557	–	–	–	–	–	–	–	5,557
Tinnevelly - -	3,093	–	–	–	–	–	–	–	3,093	1,596	–	–	–	–	–	–	–	1,596
South Canara -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Malabar - -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
TOTAL - -	5,432	214	–	145	–	–	–	–	5,791	7,167	292	–	103	69	–	–	57	7,688

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STATEMENT showing the Number of EMIGRANTS to *Ceylon*, &c., during October 1877.

DISTRICTS.	Number of Emigrants during the Month.									Average Number during the corresponding period of the Past Three Years.								
	Ceylon.	Burmah.	Straits Settlements.	Mauritius.	Réunion.	West Indies.	Cayenne.	Natal.	TOTAL.	Ceylon.	Burmah.	Straits Settlements.	Mauritius.	Réunion.	West Indies.	Cayenne.	Natal.	TOTAL.
Ganjam - -	–	100	–	–	–	–	–	–	100	–	167	–	–	–	–	–	–	167
Vizagapatam -	–	38	–	–	–	–	–	–	38	–	23	–	–	–	–	–	–	23
Godavery - -	–	284	–	–	–	–	–	–	284	–	407	–	–	–	–	–	–	407
Kistna - - -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Nellore - - -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Madras - -	–	–	–	365	–	382	–	498	1,245	–	–	–	–	–	–	–	–	–
South Arcot - -	–	–	18	–	–	*60	–	–	78	–	–	208	–	78	†55	50	–	391
Tanjore - -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Madura - -	8,328	–	265	–	–	–	–	–	8,593	9,790	–	–	–	–	–	–	–	9,790
Tinnevelly - -	3,905	–	–	–	–	–	–	–	3,905	2,218	–	–	–	–	–	–	–	2,218
South Canara -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Malabar - -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
TOTAL - -	12,233	422	283	365	–	442	–	498	14,376	12,008	597	208	–	78	55	50	–	12,996

* Guadaloupe - - - - - - 60

† Guadaloupe - - - - - - 26
Martinique - - - - - - 29
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STATEMENT showing the Number of Persons who returned from *Ceylon*, &c., during October 1877.

DISTRICTS.	Number of Persons who returned during the Month.									Average Number during the corresponding Period of the previous Three Years.								
	Ceylon.	Burmah.	Straits Settlements.	Mauritius.	Réunion.	West Indies.	Cayenne.	Natal.	TOTAL.	Ceylon.	Burmah.	Straits Settlements.	Mauritius.	Réunion.	West Indies.	Cayenne.	Natal.	TOTAL.
Ganjam - -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Vizagapatam -	–	153	–	–	–	–	–	–	153	–	104	–	–	–	–	–	–	104
Godavery - -	–	89	–	–	–	–	–	–	89	–	100	–	–	–	–	–	–	100
Kistna - - -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Nellore - - -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Madras - -	–	–	–	–	–	–	–	16	16	–	–	–	119	28	–	–	100	247
South Arcot - -	–	–	–	–	–	–	–	–	–	6	–	–	–	–	–	–	–	6
Tanjore - -	–	–	–	–	–	–	–	–	Nil.	–	–	–	–	–	–	–	–	–
Madura - -	2,371	–	–	–	–	–	–	–	2,371	4,754	–	–	–	–	–	–	–	4,754
Tinnevelly - -	3,225	–	–	–	–	–	–	–	3,225	1,711	–	–	–	–	–	–	–	1,711
South Canara -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Malabar - -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
TOTAL - -	5,596	242	–	–	–	–	–	16	5,854	6,471	204	–	119	28	–	–	100	6,922

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STATEMENT showing the Number of EMIGRANTS to *Ceylon*, &c., during November 1877.

DISTRICTS.	Number of Emigrants during the Month.									Average Number during the corresponding Period of the past Three Years.								
	Ceylon.	Burmah.	Straits Settlements.	Mauritius.	Réunion.	West Indies.	Cayenne.	Natal.	TOTAL.	Ceylon.	Burmah.	Straits Settlements.	Mauritius.	Réunion.	West Indies.	Cayenne.	Natal.	TOTAL.
Ganjam	–	572	–	–	–	–	–	–	572	–	273	–	–	–	–	–	–	273
Vizagapatam	–	71	–	–	–	–	–	–	71	–	435	–	–	–	–	–	–	435
Godavery	–	589	–	–	–	–	–	–	589	–	555	–	–	–	–	–	–	555
Kistna	–	–	–	–	–	–	–	–	Nil.	–	–	–	–	–	–	–	–	–
Nellore	–	–	–	–	–	–	–	–	Nil.	–	–	–	–	–	–	–	–	–
Madras	–	–	–	–	–	–	–	215	215	–	–	–	–	–	405	–	–	405
South Arcot	–	–	35	–	–	–	–	–	35	1	–	–	–	78	*55	50	–	184
Tanjore	110	–	496	–	–	–	–	–	606	–	–	–	–	–	–	–	–	–
Madura	5,339	–	–	–	–	–	–	–	5,339	7,983	–	–	–	–	–	–	–	7,983
Tinnevelly	2,002	–	–	–	–	–	–	–	2,002	2,612	–	–	–	–	–	–	–	2,612
South Canara	–	–	–	–	–	–	–	–	Nil.	–	–	–	–	–	–	–	–	–
Malabar	–	–	–	–	–	–	–	–	Nil.	–	–	–	–	–	–	–	–	–
TOTAL	7,451	1,232	531	–	–	–	–	215	9,429	10,596	1,263	–	–	78	460	50	–	12,447

* Guadaloupe - 26
Martinique - 29
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STATEMENT showing the Number of PERSONS who returned from *Ceylon*, &c., during November 1877.

DISTRICTS.	Number of Persons who returned during the Month.									Average Number during the corresponding Period of the previous Three Years.								
	Ceylon.	Burmah.	Straits Settlements.	Mauritius.	Réunion.	West Indies.	Cayenne.	Natal.	TOTAL.	Ceylon.	Burmah.	Straits Settlements.	Mauritius.	Réunion.	West Indies.	Cayenne.	Natal.	TOTAL.
Ganjam	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Vizagapatam	–	100	–	–	–	–	–	–	100	–	133	–	–	–	–	–	–	133
Godavery	–	59	–	–	–	–	–	–	59	–	77	–	–	–	–	–	–	77
Kistna	–	–	–	–	–	–	–	–	Nil.	–	–	–	–	–	–	–	–	–
Nellore	–	–	–	–	–	–	–	–	Nil.	–	–	–	–	–	–	–	–	–
Madras	–	–	–	–	–	–	–	–	–	–	–	–	36	–	–	–	86	122
South Arcot	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Tanjore	19	–	–	–	–	–	–	–	19	–	–	–	–	–	–	–	–	–
Madura	3,973	–	–	–	–	–	–	–	3,973	2,590	–	–	–	–	–	–	–	2,590
Tinnevelly	3,216	–	–	–	–	–	–	–	3,216	1,711	–	–	–	–	–	–	–	1,711
South Canara	–	–	–	–	–	–	–	–	Nil.	–	–	–	–	–	–	–	–	–
Malabar	–	–	–	–	–	–	–	–	Nil.	–	–	–	–	–	–	–	–	–
TOTAL	7,208	159	–	–	–	–	–	–	7,367	4,301	210	–	36	–	–	–	86	4,633

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STATEMENT showing the Number of EMIGRANTS to *Ceylon*, &c., during the Ten Months ending 31st July 1877.

DISTRICTS.	Number of Emigrants during the Ten Months ending 31st July 1877.								Average Number during the corresponding Period of previous Three Years.							
	Ceylon.	Burmah.	Straits Settlements.	Mauritius.	Réunion.	West Indies.	Natal.	TOTAL.	Ceylon.	Burmah.	Straits Settlements.	Mauritius.	Réunion.	West Indies.	Natal.	TOTAL.
Ganjam	–	–	–	–	–	–	–	3,099	–	–	–	–	–	–	–	2,036
Vizagapatam	1	1,971	–	–	–	–	–	1,972	–	1,690	–	–	–	–	–	1,690
Godavery	–	1,735	–	–	–	–	–	1,735	–	1,958	–	–	–	–	–	1,958
Kistna	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Nellore	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Madras	–	–	–	–	1,560	1,199	–	2,759	–	–	–	791	983	1,132	–	2,906
South Arcot	26	–	–	–	–	–	–	26	16	–	118	–	–	–	–	134
Tanjore	–	–	2,506	–	–	–	–	2,506	–	–	1,776	–	–	–	–	1,776
Madura	156,973	–	–	–	–	–	–	156,973	66,744	–	–	–	–	–	–	66,744
Tinnevelly	38,693	–	–	–	–	–	–	38,693	20,872	–	–	–	–	–	–	20,872
South Canara	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Malabar	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
TOTAL	195,693	3,706	2,506	–	1,560	1,199	–	204,664	87,632	3,648	1,894	791	983	1,132	–	96,080
								3,099								2,036
								207,763								98,116

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(No. 5 of 1878.)

From the Government of Bombay to the Secretary of State for India, London.

Public Works Department, Bombay Castle,
22 April 1878.

My Lord,

ADVERTING to paragraph 10 of Famine Statement No. LVII. for the week ending 22nd December 1877, we have now the honour to submit the results of the Census taken on the 19th January 1878.

2. We find that this new and partial Census leaves the question of mortality from famine very much in the same doubtful state as before; but, so far as we can judge, the following conclusions may be formed:—

1st. That the new Census taken in the Talukas or tracts of country selected as the worst or most distressed by the famine, does seem to show a diminution in the population.

2nd. That this diminution is in a considerable degree apparent only, as arising from migration, and partly real, as arising from mortality.

3rd. That the mortality arose partly from sickness other than famine—sickness extending not only throughout the year 1877, that is, the year of famine, but also throughout the two previous years 1876 and 1875, which were not years of famine—and partly also from famine.

4th. That the mortality arising from famine itself cannot be exactly estimated, but probably it was not considerable, or was, rather, comparatively inconsiderable.

We have, &c.
(signed) *Richard Temple.*
J. Gibbs.
L. R. Ashburner.

NOTE on the Census taken in January 1878 of certain TALUKAS within the Area affected by FAMINE in 1876 and 1877.

THE Census was taken on the 19th January 1878. The General Census of 1872 was taken on the 21st of February. The times of year selected on the two occasions correspond sufficiently to prevent any ordinary annual movement among the population from vitiating a comparison between the results of the two Censuses.

Selection of Districts.

2. Nine Collectorates were affected more or less severely by the famine, but it was not considered necessary to take a Census in all of these. The five districts in which, according to the returns received from the Sanitary Commissioner, the mortality had, during the nine months ending with September 1877, been highest, were chosen. These were, in order according to the height of the rate of mortality in each,

Kaladgi.	Satara.
Dharwar.	Sholapur.
Belgaum.	

The period of nine months mentioned above was taken, as January 1877 was considered to be the first month in which the death-rate could possibly have been affected by the scarcity, and as September was the last month for which returns were available. Had a selection of the five worst districts been made, not on the basis of the mortuary returns, but on the general information in the hands of Government, the only difference would have been that Poona would have been substituted for Satara.

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Selection of Talukas.

3. Within the five districts, talukas were selected in this wise: In order to know the worst, the taluka in which the death-rate appeared to have been highest was chosen, and in order to have an estimate of the effect of the famine on the whole population of the district, that taluka was chosen in which the death-rate had been most nearly identical with the death-rate of the district. The talukas in which the death-rate was shown as the highest in each district were,

Sangola in Sholapur.	Athni in Belgaum.
Man in Satara.	Ron in Dharwar.
Bagalkot in Kaladgi.	

and the talukas in which the rate of mortality most nearly agreed with that of the district were,

Madha in Sholapur.	Sampgaon in Belgaum.
Khatau in Satara.	Kod in Dharwar.
Badami in Kaladgi.	

The ascertained results for what purposes of calculation available.

4. Of these 10 talukas accordingly a census has been taken; and the method of selection having been as above described, it follows that it would be meaningless to combine, in the way of aggregation, the results pertaining to the first group of five talukas with those of the second group, or indeed to take the aggregate of the results belonging to the first five talukas at all. The returns of each of these talukas must be looked at individually: their purpose is to show how far the population of each district has been affected by the famine in that subdivision in which, as was conjectured, the effect of the famine was greatest; though, as is explained below, they cannot in all cases be accepted as indicating this. On the other hand, the second group of talukas having been selected each as the average representative of its district, the results in their case, it was expected, might have been combined to furnish an estimate of the effect of the famine on the whole population of the five districts. But though at the time of selecting the worst and the mean talukas, it was thought best to be guided by the mortuary returns, the results of the Census tend to show that those returns did not furnish the very best guide. In the cases of Sholapur and Kaladgi the talukas selected as average ones appear from the Census to have suffered much more than those supposed to be the worst. But it is to be noticed that in these two cases the selection of worst talukas made on the basis of the mortuary returns is not the same as would have been made if the recorded accounts of the condition of the talukas only had been considered, while in those cases in which the mortuary returns correspond with the general accounts of the talukas, the Census returns also are found to agree. Thus in the districts of Satara, Belgaum, and Dharwar, the talukas of Man, Athni, and Ron respectively are indicated as the worst as well by the accounts received of the failure of crops, &c., as by the mortuary returns. But in Sholapur it is the very taluka (Madha) selected by the mortuary returns, as an average one, that the reports at the close of 1876 showed to be the worst of all. Madha was the only taluka in Sholapur in which the outturn of both kharif and rabi crops was estimated as nothing. Of the talukas of Kaladgi worse accounts were given of three others than of either Bagalkot or Badami. The returns of the talukas of the second group therefore must be taken, like those of the first, each by itself. And in judging of the returns of the 10 talukas it can safely be assumed only in the case of Man, Athni, and Ron that the taluka in question is the worst of its district, though that is probably true also in the case of Madha. Of the other talukas Sangola may be taken as one of the worst three in Sholapur, Khatau as one of the worst four in Satara; Bagalkot was a little below the average, and Badami, except in the matter of prices, one of the best in Kaladgi; the accounts of Sampgaon are conflicting, as its crops were estimated to be among the best in the district, while as regards rainfall and prices, it was amongst the worst; Kod was one of the best districts in Dharwar.

Selection of particulars of enumeration.

5. The purpose of the Census being merely to ascertain to what extent the growth of the population had been checked by the famine, it was deemed unnecessary to make the Census meet all the requirements of the elaborate returns called for on the occasion of the general Census. Other reasons of

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simplifying the work as much as possible were the long and trying labours the district officers and their subordinates had just undergone, and the wish to obtain the results of the Census while famine and famine policy were still prominent objects in the deliberations of the Indian Governments. Accordingly, those of the statements prescribed for the general Census of 1872 which are not addressed to matters liable to be immediately influenced by famine have been on this occasion omitted, and no classifications of the population have been made except those according to (1) sex, (2) age, (3) religion in so far as the divisions connote race, (4) condition as judged from the style of house dwelt in, and (5) occupation in so far as it is agricultural or not. As regards the classification according to ages, the same divisions of age have been observed as in 1872. As regards religion, the numbers of Buddhists and Christians in the districts in question were too small for it to be worth while to maintain them as separate classes; indeed it was only on account of the numbers of these classes in Burma and Madras that they were so distinguished in 1872, so only Hindus and Muhammadans have been shown separately, and the few others remaining counted together. As regards occupation a more particular classification would have been made, but that the previous Census would furnish no standard of comparison, Form No. VI. having been prepared in 1872 according to districts only and not according to talukas.

The returns prepared with additional lines comparing the figures of 1872 with those of 1878.

6. The results of the Census now taken are set forth in the accompanying Tables, and, to facilitate comparison, the corresponding figures of the Census of 1872 are set out in parallel lines throughout the Tables, the difference in each case being shown in a third line below. In some points—but fortunately points of less importance—no comparison is practicable as different standards have been adopted, or some of the instructions differently interpreted on the two occasions, and indeed in different districts and different talukas of the same district on the same occasion. Thus a comparison of the number of enclosures with the number of houses shows that the definition of enclosure has in some cases been misunderstood. A comparison of the number of houses of the better sort in 1872 with the number in 1878 shows that in some cases a different standard of quality has been taken. Again in both talukas of Belgaum and in Madha of Sholapur some classes not counted as Hindus in 1872 have obviously been counted as such in 1878. And lastly, the number given as the total agricultural population is, in many instances in the returns of 1872, and in the case of Kaladgi in 1878, obviously too small in comparison with the number of male agriculturists above 20 years of age. But these discrepancies do not interfere with the more important objects of the Census. The salient points indicated by the different Tables are considered in the following paragraphs.

No. I. General Statement of Area and Population. A. Abstract, p. 31.

7. The first Table shows that with the exception of the taluka of Kod in Dharwar where there is a slight increase, there has been a diminution in the population of every taluka since 1872. Of the population recorded in 1872 the per-centage of diminution for each taluka is given below:—

Sangola	3 per cent.	Badami	20 per cent.
Madha	19 „	Athni	13 „
Man	12 „	Sampgaon	4 „
Khatau	10 „	Ron	7 „
Bagalkot	11 „		

In Kod an increase of 1·7 is shown on the population of 1872.

This is briefly the result of the Census just taken, but an examination of the detailed returns is necessary to a proper understanding of its significance.

No. I. General Statement of Area and Population. B. Details of Population, p. 32.

8. In the second Table the people are classified (1) according as they live in houses of the better or of inferior sort, (2) according to sex, and (3) according as they are Hindus, Muhammadans, or of some other denomination.

That the poorer people should suffer from the scarcity more than those in better condition is axiomatic, but the Table furnishes no means of comparing the ratios of diminution of the two divisions, as the classification of houses has not been regular.

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An examination of columns 7 and 8 of this Table discloses that the number of males has diminished a great deal more than the number of females. This is true of every taluka except Kod, where there has been no diminution, and where such increase as there has been is more among males than females. The exception is important as indicating, so far as it goes, that the difference in the rates of diminution of males and females is really due to a cause relating to famine, the cause being found to bear its result in every taluka except that in which the influence of the famine was least. The per-centage of diminution in the numbers of each sex in each of the nine other talukas is shown below:— Sex.

DISTRICT.	TALUKA.	Per-centage of Diminution of the Population of 1872.	
		Males.	Females.
Sholapur	Sangola	4	2
	Madha	21	18
Satara	Man	13	10
	Khatau	11	9
Kaladgi	Bagalkot	13	10
	Badami	22	18
Belgaum	Athni	14	11
	Sampgaon	5	8
Dharwar	Ron	9	5

As there is no known reason why the male population should decrease much, if at all, faster than the female, whereas it is probable that men go further in search of occupation than women, the deduction to be drawn appears to be that part of the diminution of population the Census shows in this respect is due to migration only.

The columns from No. 9 to the end show the classification according to race. The same numbering of columns has been retained as in the Tables of the Census of 1872, and where one column now represents more than one of those of 1872, the numbers of the component columns are all entered and joined with the sign +. The population of these districts is in such preponderance Hindu that little is indicated by the Census as to the comparative effect of the famine on the different nationalities. In three only of the ten selected talukas is another class found large enough to form a basis of comparison with the other inhabitants. These are the Muhammadans of Athni and Sampgaon in Belgaum and of Bagalkot in Kaladgi. In the last-named taluka the diminution of the Muhammadan population has differed little from that of the other people, it being 12 per cent. in the case of the Muhammadans and nearly 12 per cent. in the case of the others. But in the two talukas of Belgaum the difference is very great, the Muhammadan population of Athni and Sampgaon being less respectively by 24 and 21 per cent. than in 1872, while the diminution in the people of other races is less only by 12 and 2 per cent. respectively. Race.

9. The third Table shows, separately for males and females, the population divided into nine classes according to age. Comparing the results with those of the Census of 1872 it will be seen that there is a very great diminution in the numbers of very young children, an increase in the numbers of older children and persons up to 20 years of age, a slight diminution in those between 20 and 40 years of age, a more considerable diminution of those above 40, and a great diminution in those above 60 years of age. Or, stating the results in greater detail, the diminution in the number of infants under one year of age varies from 23 per cent. in Kod to 73 per cent. in Badami; that in the children between one and six years of age from 13 per cent. in Man to 41 per cent. in Bagalkot. The number of children between 6 and 12 has increased in seven out No. II A. General Statement of Population according to Age, p. 34.

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out of the ten talukas. So also the persons between 12 and 20 years of age have increased in seven out of the ten talukas. But those between 20 and 30 are fewer in eight talukas; those between 30 and 40 fewer in seven talukas; those between 40 and 50 fewer in nine talukas, the per-centage of diminution rising to 21 per cent. in Man; those between 50 and 60 are fewer in eight talukas, the per-centage rising to 28 per cent. in Badami; and those above 60 years of age are fewer in eight out of the ten talukas, the per-centage of diminution amounting to 57 per cent. in the Man taluka.

Now, it is well known that in ordinary years the diminution among the very young and the very old is very much more than among those of intermediate ages; and in a year of famine, such diminution would be even much more marked than in ordinary years. The registration during 1877, the records of which are now complete, fully bears this out.

In 1872 it was computed that the death-rate amounted to 3·557 per cent. of the whole population of the Presidency of Bombay, whereas in 1877 it amounted to 3·876 per cent., and in the nine affected districts to 5·477 per cent. of the population of those districts, indicating large mortality; but, even assuming a death-rate based upon the loss of very young children, which is the most unfavourable view of the case, the census of 1878 most distinctly indicates very large migration from Madha and Badami, a fact borne out by the reports of the District Officers, considerable migration from Man, Khatau, Bagalkot, and Athni, and some migration into Kod.

10. It is impossible to state precisely what proportion of the loss exhibited by the Census of 1878 is due to excess deaths from 1872 to 1876, to excess deaths during 1877, and to migration out of the distressed districts, but an examination of the calculations and speculations given in the appendix to this note will tend to throw some light, at any rate, upon the subject.

No. IV. Statement of Population with reference to Land and Land Revenue, p. 36.

11. The materials for comparison are so incomplete in the case of the fourth Table that no deductions can be drawn from it.

C. J. Merriman, Colonel, R.E.,
Acting Secretary to Government.

Public Works Department,
Bombay, 30 March 1878.

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No. 1.—GENERAL STATEMENT OF AREA AND POPULATION.

(A.)—Abstract.

Collectorates.	Talukas.		Area in Square Miles.	Number of Villages, Mauzas, or Townships.	Number of Inclosures.	Number of Houses.	Total Population.	Persons per Square Mile.
	1.		2.	3.	4.	5.	6.	7.
Sholápur	Sángola	February 1872	647·98	77	11,430	11,430	62,960	97·17
		January 1878	647·93	76	9,218	9,308	60,640	93·59
		Difference	- - -	— 1	— 2,212	— 2,122	— 2,320	— 3·58
	Mádha	February 1872	612·93	90	10,513	18,935	103,981	169·65
		January 1878	612·93	89	8,586	16,608	83,317	135·93
		Difference	- -	— 1	— 1,927	— 2,327	— 20,664	— 33·72
Satara	Mán	February 1872	627	77	9,474	10,392	62,198	99·20
		January 1878	640·25	78	9,229	10,224	54,686	85·
		Difference	- -	+ 1	* — 245	— 168	— 7,512	— 14·20
	Khatau	February 1872	499·5	87	9,728	13,243	81,950	164·06
		January 1878	530	87	11,273	13,101	73,668	138·99
		Difference	- -	- -	+ 1,545	— 142	— 8,282	— 25·07
Kaládgi	Bágalkot	February 1872	684·05	175	21,780	21,780	110,185	161·08
		January 1878	682·22	174	22,670	23,274	97,177	142·44
		Difference	- -	— 1	+ 890	+ 1,494	— 13,008	— 18·64
	Bádámi (excluding the Gajendragad Jagir)	February 1872	611·44	174	1	21,472	114,288	186·93
		January 1878	610·92	182	22,376	22,396	90,489	148·11
		Difference	- -	+ 8	- * -	+ 924	— 23,799	— 38·82
Belgaum	Athni	February 1872	789	83	18,640	21,474	114,677	145·34
		January 1878	789	81	19,039	19,039	99,554	126
		Difference	- -	— 2	+ 399	— 2,435	— 15,123	— 19·34
	Sampgaon	February 1872	409	140	26,392	26,444	131,504	321·53
		January 1878	409	122	26,481	26,481	125,804	308
		Difference	- -	— 18	+ 89	+ 37	— 5,700	— 13·53
Dharwar	Ron	February 1872	369·35	59	14,589	14,589	73,503	199·01
		January 1878	369·35	59	14,680	14,680	68,065	187·1
		Difference	- -	- -	+ 91	+ 91	— 5,438	— 11·91
	Kod	February 1872	398·90	189	14,652	14,915	79,099	198·29
		January 1878	398·90	189	18,830	18,830	80,472	201·7
		Difference	- -	- -	+ 4,178	+ 3,915	+ 1,373	+ 3·41

* No comparison practicable; *see* paragraph 6 of the accompanying Note.

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No. I.—GENERAL STATEMENT OF AREA AND POPULATION—*continued.*

(B.)—Details of Population.

Collectorates.	Talukas.		Total Population.	Houses. Of the Better Sort. Number of Houses.	Houses. Of the Better Sort. Number of their Inhabitants.	Houses. Of Inferior Sort. Number of Houses.	Houses. Of Inferior Sort. Number of their Inhabitants.	Details of Population. Total Males.	Total Females.	Hindus. Males.	Hindus. Females.	Hindus. Total.	Muhammadans. Males.	Muhammadans. Females.	Muhammadans. Total.	Others. Males.	Others. Females.	Others. Total.
	1.		2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15+18+21.	16+19+22.	17+20+23.
Sholápur	Sángola	February 1872	62,960	1,383	8,509	10,047	54,451	32,194	30,766	31,201	29,762	60,963	942	955	1,897	51	49	100
		January 1878	60,640	842	5,395	8,220	55,245	30,654	29,986	29,615	28,947	58,562	1,016	1,007	2,023	23	32	55
		Difference	—2,320	—541	—3,114	—1,827	+794	—1,540	—780	—1,586	—815	—2,401	+74	+52	+126	—28	—17	—45
	Mádha	February 1872	103,981	569	3,918	18,366	100,063	53,466	50,515	49,848	47,177	97,025	2,615	2,402	5,017	1,003	936	1,939
		January 1878	83,317	1,190	7,027	15,418	76,290	41,925	41,392	40,046	39,655	79,701	1,867	1,729	3,596	12	8	20
		Difference	—20,664	+621	+3,109	—2,948	—23,773	—11,541	—9,123	—9,802	—7,522	—17,324	—748	—673	—1,421	—991	—928	—1,919
Sátara	Mán	February 1872	62,198	1,429	7,187	8,963	55,011	31,932	30,266	31,120	29,480	60,600	694	677	1,371	118	109	227
		January 1878	54,686	2,108	13,254	8,116	41,432	27,578	27,108	27,012	26,522	53,534	558	582	1,140	8	4	12
		Difference	—7,512	+679	+6,067	—847	—13,579	—4,354	—3,158	—4,108	—2,958	—7,066	—136	—95	—231	—110	—105	—215
	Khatau	February 1872	81,950	360	2,572	12,883	79,378	41,733	40,217	40,354	38,981	79,335	1,074	1,025	2,099	305	211	516
		January 1878	73,668	619	4,887	12,482	68,781	37,078	36,590	36,263	35,728	71,991	815	862	1,677	—	—	—
		Difference	—8,282	+259	+2,315	—401	—10,597	—4,655	—3,627	—4,091	—3,253	—7,344	—259	—163	—422	—305	—211	—516

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Kaládgi	Bágalkot	February 1872	110,185	45	106	21,735	110,079	56,183	54,002	50,506	48,532	99,038	5,561	5,362	10,923	116	108	224
		January 1878	97,177	140	957	23,134	96,220	48,676	48,501	43,885	43,639	87,524	4,737	4,836	9,573	54	26	80
		Difference	−13,008	+95	+851	+1,399	−13,859	−7,507	−5,501	−6,621	−4,893	−11,514	−824	−526	−1,350	−62	−82	−144
	Bádámi (excluding the Gajendragad jágir).	February 1872	114,288	8	65	21,469	114,216	58,365	55,923	54,672	52,529	107,201	3,661	3,345	7,006	40	41	81
		January 1878	90,489	1,138	4,859	21,258	85,630	45,180	45,309	42,229	42,511	84,740	2,726	2,642	5,368	225	156	381
		Difference	−23,799	+1,135	+4,794	−211	−28,586	−13,185	−10,614	−12,443	−10,018	−22,461	−935	−703	−1,638	+185	+115	−300
Belgaum	Athni	February 1872	114,677	4,212	25,959	17,262	88,718	58,582	56,095	46,426	44,435	90,861	5,645	5,464	11,109	6,511	6,196	12,707
		January 1878	99,554	434	2,888	18,605	96,666	49,969	49,585	45,734	45,328	91,062	4,208	4,230	8,438	27	27	54
		Difference	−15,123	−3,778	−23,071	+1,343	+7,948	−8,613	−6,510	−692	+893	+201	−1,437	−1,234	−2,671	−6,484	−6,169	−12,653
	Sampgaon	February 1872	131,504	70	80	26,374	131,424	66,691	64,813	59,367	57,696	117,063	5,634	5,508	11,142	1,690	1,609	3,299
		January 1878	125,804	73	123	26,408	125,681	63,176	62,628	58,777	58,203	116,980	4,359	4,400	8,759	40	25	65
		Difference	−5,700	+3	+43	+34	−5,743	−3,515	−2,185	−590	+507	−83	−1,275	−1,108	−2,383	−1,650	−1,584	−3,234
Dharwar	Ron	February 1872	73,503	181	1,513	14,408	71,990	37,273	36,230	34,226	33,367	67,593	3,015	2,831	5,846	32	32	64
		January 1878	68,065	2,458	15,970	12,222	52,095	33,688	34,377	31,254	31,893	63,147	2,401	2,454	4,855	33	30	63
		Difference	−5,438	+2,277	+14,457	−2,186	−19,895	−3,585	−1,853	−2,972	−1,474	−4,446	−614	−377	−991	+1	−2	−1
	Kod	February 1872	79,099	366	2,330	14,549	76,769	40,493	38,606	36,780	35,212	71,992	3,518	3,175	6,693	195	219	414
		January 1878	80,472	170	361	18,660	80,111	41,424	39,048	37,725	35,659	73,384	3,491	3,189	6,680	208	200	408
		Difference	+1,373	−196	−1,969	+4,111	+3,342	+931	+442	+945	+447	+1,392	−27	+14	−13	+13	−19	−6

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No. II A.—GENERAL STATEMENT of POPULATION according to AGE.

Collectorates.	TALUKAS.			Not exceeding 1 Year.	Above 1 and not exceeding 6 Years.	Above 6 and not exceeding 12 Years.	Above 12 and not exceeding 20 Years.	Above 20 and not exceeding 30 Years.	Above 30 and not exceeding 40 Years.	Above 40 and not exceeding 50 Years.	Above 50 and not exceeding 60 Years.	Above 60 Years.
	1.			47.	48.	49.	50.	51.	52.	53.	54.	55.
Sholápur	Sángola	Males	February 1872	984	6,311	5,475	4,272	5,962	3,913	2,811	1,748	718
			January 1878	633	4,705	6,253	4,513	5,742	4,135	2,667	1,469	537
			Difference -	—351	— 1,606	+ 778	+ 241	— 220	+ 222	— 144	— 279	— 181
		Females	February 1872	931	6,063	4,338	4,050	6,155	3,893	2,545	1,548	643
			January 1878	628	4,791	5,251	4,554	6,210	4,140	2,402	1,473	537
			Difference -	—303	— 1,272	+ 913	— 96	+ 55	+ 247	— 143	— 75	— 106
	Mádha	Males	February 1872	2,516	9,226	8,436	6,806	10,290	7,012	5,198	2,990	992
			January 1878	1,134	5,998	7,832	6,089	8,243	5,771	3,913	2,157	788
			Difference -	—1,382	—3,228	— 604	— 717	—2,047	—1,241	—1,285	— 833	— 204
		Females	February 1872	2,533	9,084	7,113	7,592	10,381	6,352	4,212	2,278	970
			January 1878	1,116	5,903	7,271	6,265	8,803	5,263	3,783	2,224	764
			Difference -	—1,417	—3,181	+ 158	—1,327	—1,578	—1,089	— 429	— 54	— 206
Satara	Mán	Males	February 1872	1,154	5,331	5,130	3,912	5,002	4,342	3,226	1,962	1,853
			January 1878	614	4,582	5,445	3,802	4,859	3,625	2,482	1,442	727
			Difference -	— 540	— 749	+ 315	— 110	— 143	— 717	— 744	— 540	—1,126
		Females	February 1872	1,172	5,173	4,087	3,267	5,607	4,480	2,805	1,756	1,919
			January 1878	601	4,453	4,632	3,774	5,284	3,631	2,261	1,501	871
			Difference -	— 571	— 720	+ 545	+ 507	— 223	— 849	— 544	— 255	—1,048
	Khatau	Males	February 1872	916	7,633	7,165	5,477	6,571	5,500	3,832	2,670	1,969
			January 1878	1,214	6,227	6,943	5,314	6,567	4,630	3,173	1,966	1,044
			Difference -	+ 298	—1,406	— 222	— 163	— 4	— 870	— 659	— 704	— 925
		Females	February 1872	840	7,262	5,633	5,073	7,905	5,635	3,584	2,419	1,866
			January 1878	930	6,095	5,906	5,277	7,380	4,818	3,193	1,994	997
			Difference -	+90	—1,167	+ 273	+ 204	— 525	— 817	— 391	— 425	— 869

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No. II A.—General Statement of Population according to Age—*continued.*

Collectorates.	Talukas.			Not exceeding 1 Year.	Above 1 and not exceeding 6 Years.	Above 6 and not exceeding 12 Years.	Above 12 and not exceeding 20 Years.	Above 20 and not exceeding 30 Years.	Above 30 and not exceeding 40 Years.	Above 40 and not exceeding 50 Years.	Above 50 and not exceeding 60 Years.	Above 60 Years.
	1.			47.	48.	49.	50.	51.	52.	53.	54.	55.
Kaládgi	Bágalkot	Males	February 1872	1,153	10,453	8,649	7,213	10,218	8,379	5,974	2,680	1,464
			January 1878	493	6,011	7,880	8,140	8,774	7,252	5,339	3,799	973
			Difference	— 660	— 4,442	— 769	+ 927	— 1,444	— 1,127	— 635	+ 1,119	— 491
		Females	February 1872	1,131	10,002	6,931	6,604	11,322	7,859	4,974	2,785	2,394
			January 1878	527	5,938	7,584	6,529	9,168	7,591	5,170	4,491	1,503
			Difference	— 604	— 4,064	+ 653	— 75	— 2,154	— 268	+ 196	+ 1,706	— 891
	Bádámi (excluding the Gajendragad Jagir).	Males	February 1872	1,637	10,767	9,144	8,116	10,040	8,331	5,903	3,077	1,358
			January 1878	459	6,441	8,271	6,628	9,884	6,597	4,299	1,916	685
			Difference	— 1,178	— 4,326	— 873	— 1,488	— 156	— 1,734	— 1,604	— 1,161	— 673
		Females	February 1872	1,524	10,666	7,705	7,820	10,731	7,868	4,808	2,905	1,879
			January 1878	387	6,218	7,728	6,833	9,772	6,720	4,187	2,386	1,078
			Difference	— 1,137	— 4,448	+ 23	— 996	— 959	— 1,148	— 621	— 519	— 801
Belgaum	Athni	Males	February 1872	3,133	9,813	9,145	7,696	10,190	8,129	5,895	3,203	1,378
			January 1878	1,322	7,344	9,164	7,341	9,225	7,241	4,723	2,676	933
			Difference	— 1,811	— 2,469	+ 19	— 355	— 965	— 888	— 1,172	— 527	— 445
		Females	February 1872	3,146	9,091	7,584	7,771	10,887	7,706	4,962	3,351	1,597
			January 1878	1,405	7,083	8,302	7,043	9,623	7,045	4,675	3,090	1,319
			Difference	— 1,741	— 2,008	+ 718	— 728	— 1,264	— 661	— 287	— 261	— 278
	Sampgaon	Males	February 1872	3,118	11,137	11,821	9,881	11,530	8,320	5,830	3,285	1,669
			January 1878	2,122	9,502	11,511	10,445	11,349	8,415	5,385	2,895	1,552
			Difference	— 996	— 1,635	— 310	+ 564	— 181	+ 95	— 445	— 490	— 117
		Females	February 1872	3,393	10,708	10,118	10,179	12,073	8,274	5,198	3,219	1,651
			January 1878	2,162	9,379	10,473	9,670	12,102	8,382	5,299	3,290	1,871
			Difference	— 1,231	— 1,329	+ 355	— 509	+ 29	+ 108	+ 101	+ 71	+ 220
Dharwar	Ron	Males	February 1872	873	5,798	5,654	5,407	5,932	4,498	3,926	2,985	2,200
			January 1878	402	4,311	5,577	5,896	6,325	4,562	3,009	2,255	1,351
			Difference	— 471	— 1,487	— 77	+ 489	+ 393	+ 64	— 917	— 730	— 849
		Females	February 1872	858	5,514	5,207	4,683	6,139	5,061	3,699	2,595	2,474
			January 1878	347	4,225	5,520	4,972	6,797	4,768	3,450	2,539	1,759
			Difference	— 511	— 1,289	+ 313	+ 289	+ 658	— 293	— 249	— 56	— 715
	Kod	Males	February 1872	1,042	6,811	7,038	6,337	7,108	5,455	3,583	2,238	881
			January 1878	762	5,291	6,770	7,347	7,281	5,935	3,976	3,116	946
			Difference	— 280	— 1,520	— 268	+ 1,010	+ 173	+ 480	+ 393	+ 878	+ 65
		Females	February 1872	940	7,149	6,505	6,401	7,311	4,556	2,963	1,875	906
			January 1878	763	5,306	6,896	5,983	7,566	5,201	3,334	2,928	1,071
			Difference	— 177	— 1,843	+ 391	— 418	+ 255	+ 645	+ 371	+ 1,053	+ 165

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No. IV.—STATEMENT of POPULATION with reference to LAND and LAND REVENUE.

Collectorates.	TALUKAS. 1.		Total Population. 2.	Total Agricultural Population. 3.	Total Male Agriculturalists above 20 Years of Age. 4.
Sholápur	Sángola	February 1872	62,960	12,285	(Not obtainable.)
		January 1878	60,640	32,337	8,665
		Difference	— 2,320	*	*
	Mádha	February 1872	103,981	17,994	(Not obtainable.)
		January 1878	83,317	32,998	9,400
		Difference	— 20,664	*	*
Satara	Mán	February 1872	62,198	10,778	(Not obtainable.)
		January 1878	54,686	29,673	9,090
		Difference	— 7,512	*	*
	Khatau	February 1872	81,950	19,961	(Not obtainable.)
		January 1878	73,668	33,991	11,878
		Difference	— 8,282	*	*
Kaládgi	Bágalkot	February 1872	110,185	15,691	14,217
		January 1878	97,177	16,715	10,255
		Difference	— 13,008	*	— 3,962
	Bádámi (excluding Gajendragad).	February 1872	114,288	19,735	17,097
		January 1878	90,489	47,317	13,541
		Difference	— 23,799	*	— 3,556
Belgaum	Athni	February 1872	114,677	16,240	7,937
		January 1878	99,554	35,756	11,701
		Difference	— 15,123	*	*
	Sampgaon	February 1872	131,504	17,130	7,879
		January 1878	125,804	51,838	16,162
		Difference	— 5,700	*	*
Dharwar	Ron	February 1872	73,503	12,213	9,523
		January 1878	68,065	36,071	9,408
		Difference	— 5,438	*	— 115
	Kod	February 1872	79,099	16,280	11,607
		January 1878	80,472	53,672	12,838
		Difference	+ 1,373	*	+ 1,231

* No comparison practicable; *see* para. 6 of the accompanying Note.

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APPENDIX,

With Tables (A.) to (G.).

The death-rate for the whole Presidency was, in 1877=38·76 per 1,000 of population.

The death-rate of each class was, during the same year,—

Infants under 1	149·43	per 1,000
Children 1 to 12	28·75	„
Adults 12 to 50	25·64	„
Old people above 50	125·72	„

Taking the ratio of increase as 1 per cent. per annum, the population at the beginning of 1878 ought to have been 6·15 per cent. greater than shown by the Census of 1872. Table (E.) shows the difference between the census returns of January 1878, and the population of 1872 raised 6·15 per cent.

Calling this difference *loss*, Table (F.) shows the loss per 1,000 of each class in each taluka, and the question comes what proportion of this loss, if any, is due to migration?

It may be reasonably supposed that whatever portion of the loss is due to death, in such portion the respective losses of each class would approximate to that shown above, and that the special conditions giving rise to increased mortality in 1877 would tend rather to raise than to lower the loss of infants and old people, as compared with the loss of children and adults.

Table (G.) is obtained by dividing the loss per 1,000 of each class by the figures given above. Where the figures under the columns children and adults exceed the figures under the columns infants and old people, we must either suppose that the special conditions above referred to caused increased mortality among children and adults as compared with infants and old people, or what is more reasonable that a portion of the loss was due to migration of children and adults, and the greater the difference between the figures the greater such migration.

Referring to Table (G.) it will be seen that the figures under children and adults exceed those under infants and old people in greatest proportion in the talukas of Bádámi and Mádha, indicating that a large portion of the loss of population of those two talukas was due to migration. Bádámi shows the highest loss rate for children, and nearly the highest loss rate for old people, indicating a large mortality as well as much migration. More or less migration is also indicated from the following talukas:—Mán, Khatau, Bágalkot and Athni. No migration is indicated from Sángola; here the loss is probably due to mortality, what proportion in 1877, and what in previous years, it is impossible to say. The same remarks apply to Ron. On the other hand, the figures indicate migration into Kod, hence the indications are—

Large migration from Bádámi and Mádha.
Less migration from Mán, Khatau, Bágalkot, and Athni.
No migration indicated Sángola and Ron.*
Migration into Kod.

If the talukas are placed in order of their loss rate, we have—

1st. Bádámi, 254·11; Mádha, 245·15.

2nd. Athni, 187·10; Mán, 171·72; Bágalkot, 169·29; Khatau, 153·14.

3rd. Ron, 127·64; Sampgaon, 98·78; Sángola, 92·66.

4th. Kod, 41·58.

As a speculation, as to the amount of migration from each taluka, we may proceed as follows:—Assuming that the loss rate of children and adults, in excess of that for infants and old people, represents migration, we find that in the six talukas named this amounted to,—

Mádha -	12,091	individuals=loss per 1,000 of population of the taluka,	110·95
Bádámi -	10,081	„ „ „ „	83·09
Bágalkot	8,351	„ „ „ „	71·39
Khatau -	4,211	„ „ „ „	48·40
Athni -	5,010	„ „ „ „	41·15
Mán -	1,785	„ „ „ „	26·71

These

* *See* Note to Table (G.).

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These figures are obtained by taking from Table (G.) the highest of the two figures under infants and old people, *i. e.*, the figure under infants in every taluka except Khatau, and deducting it from the figures under children and adults, the remainders multiplied by 28·75 and 25·64 respectively, give loss per 1,000 of children and adults due to migration, and these, calculated on the numbers of each class, give the loss of individuals.

But it is fair to suppose that the actual migration was higher than the numbers shown above for the following reasons:—

1st. The migration rate is calculated above on the presumption that the special causes prevailing in 1877 caused increased mortality of all classes alike. Now Table (G.) shows that in every taluka except one (Khatau), and one (Mán) where the losses are equal, the loss of old people was less than that of infants, from which it may be presumed that, of the two classes (infants and old people) likely to suffer most, the infants suffered in greater proportion than the old people.

2nd. Migration of children and adults would, in all probability, be accompanied by migration of infants and old people, of which no notice has been taken in the calculation.

We may attempt to eliminate the error from the first of these two causes by repeating the calculation just made, employing the mean of the figures in Table (G.) under infants and old people in place of the highest of the two figures; modifying the calculation in this way, we get the following migration rates:—

Mádha	-	14,802	individuals = loss per 1,000,	134·10
Bádámi	-	12,952	„ „	106·76
Bágalkot	-	13,696	„ „	117·09
Khatau	-	8,131	„ „	93·46
Athni	-	8,261	„ „	67·86
Mán	-	1,785	„ „	26·71
Sampgaon		4,921	„ „	35·25

The recorded death-rate during 1877, in the nine affected districts, was 54·77 per 1,000, and the death-rate of each class in the same districts was—

Infants under 1 - - - - -	173·16	per 1,000
Children 1 to 12 - - - - -	42·91	„
Adults 12 to 50 - - - - -	35·85	„
Old people over 50 - - - -	176·16	„

Repeating the last calculation, employing these figures instead of the figures for the whole Presidency, we get the following migration rates:—

Mádha, loss per 1,000 - - - -	122·79	
Bádámi „ - - - -	91·82	
Bágalkot „ - - - -	115·82	
Khatau „ - - - -	95·46	
Athni „ - - - -	56·67	
Mán „ - - - -	22·76	
Sampgaon „ - - - -	27·98	

It will be noticed that in two cases, Bágalkot and Sampgaon, these estimated migration rates, if deducted from the total loss-rate, give figures below the recorded death-rate in the taluka. But the migration rates deducted from the loss rates, only give the excess loss which has taken place in each taluka during the six years ending January 1878, over and above that due to the loss by average mortality during the same period. Three causes may have been in operation to produce this excess loss,—

1st. Migration of infants and old people accompanying migrating children and adults, of which, in the previous calculations, no notice has been taken.

2nd. Excess mortality during the five years ending January 1877.

3rd. Excess mortality during the year ending January 1878.

What proportion of the excess loss is attributable to each of these heads it is not possible to say.

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TABLE (A.)—POPULATION of 1872.

TALUKAS.	Population of 1872.	Infants under 1.	Children 1 to 12.	Adults 12 to 50.	Old People over 50.
Sángola - - -	62,960	1,915	22,187	34,201	4,657
Mádha - - -	103,981	5,049	33,859	57,843	7,230
Mán - - - -	62,198	2,326	19,721	32,641	7,510
Khatau - - -	81,950	1,756	27,693	43,577	8,924
Bágalkot - - -	110,185	2,284	36,035	62,543	9,323
Bádámi - - -	114,288	3,161	38,282	63,626	9,219
Athni - - - -	114,677	6,279	35,633	63,236	9,529
Sampgaon - - -	131,504	6,511	43,784	71,285	9,924
Ron - - - -	73,503	1,731	22,173	39,345	10,254
Kod - - - -	79,099	1,982	27,503	43,714	5,900

TABLE (B.)—LOSSES since 1872.

TALUKAS.	TOTAL.	Infants under 1.	Children 1 to 12.	Adults 12 to 50.	Old People over 50.
Sángola - - -	2,320	654	1,187	+ 162	641
Mádha - - -	20,664	2,799	6,855	9,713	1,297
Mán - - - -	7,512	1,111	609	2,823	2,969
Khatau - - -	8,282	+ 388	2,522	3,225	2,923
Bágalkot - - -	13,023	1,264	8,622	4,580	+ 1,443
Bádámi - - -	23,799	2,315	9,624	8,706	3,154
Athni - - - -	15,123	3,552	3,740	6,320	1,511
Sampgaon - - -	5,700	2,227	2,919	238	316
Ron - - - -	5,438	982	2,540	+ 434	2,350
Kod - - - -	+ 1,373	457	3,240	+ 2,909	+ 2,161

TABLE (C.)—6·152 per Cent. on TOTALS of A.

TALUKAS.	TOTAL.	Infants under 1.	Children 1 to 12.	Adults 12 to 50.	Old People over 50.
Sángola - - -	3,873	117	1,364	2,104	286
Mádha - - -	6,395	310	2,083	3,558	444
Mán - - - -	3,826	143	1,213	2,008	462
Khatau - - -	5,040	118	1,693	2,680	549
Bágalkot - - -	6,773	140	2,216	3,847	573
Bádámi - - -	7,030	194	2,355	3,914	567
Athni - - - -	7,054	386	2,192	3,890	586
Sampgaon - - -	8,089	400	2,693	4,385	610
Ron - - - -	4,521	106	1,364	2,420	630
Kod - - - -	4,865	121	1,691	2,689	362

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TABLE (D.)—ASSUMED POPULATION of 1878 = A. + C.

TALUKAS.	TOTAL.	Infants under 1.	Children 1 to 12.	Adults 12 to 50.	Old People over 50.
Sángola - - -	66,833	2,032	23,551	36,805	4,943
Mádha - - - -	110,376	5,359	35,942	61,401	7,674
Mán - - - -	66,024	2,469	20,934	34,649	7,972
Khatau - - -	86,990	1,874	29,386	46,257	9,473
Bágalkot - - -	116,963	2,424	38,251	66,390	9,896
Bádámi - - -	121,318	3,355	40,637	67,540	9,786
Athni - - - -	121,731	6,665	37,825	67,126	10,115
Sampgaon - - -	139,593	6,911	46,477	75,670	10,534
Ron - - - -	78,024	1,837	23,537	41,765	10,884
Kod - - - -	83,964	2,103	29,194	46,403	6,262

TABLE (E.)—ASSUMED LOSS since 1872 = B. + C.

TALUKAS.	TOTAL.	Infants under 1.	Children 1 to 12.	Adults 12 to 50.	Old People over 50.
Sángola - - -	6,193	771	2,551	1,942	927
Mádha - - - -	27,059	3,109	8,938	13,271	1,741
Mán - - - -	11,338	1,254	1,822	4,831	3,431
Khatau - - -	13,322	+ 270	4,215	5,905	3,472
Bágalkot - - -	19,801	1,404	10,838	8,427	+ 870
Bádámi - - -	30,829	2,509	11,979	12,620	3,721
Athni - - - -	22,177	3,938	5,932	10,210	2,097
Sampgaon - - -	13,789	2,627	5,612	4,623	926
Ron - - - -	9,959	1,088	3,904	1,986	2,980
Kod - - - -	3,492	578	4,931	+ 220	+ 1,799

TABLE (F.)—LOSS per 1,000 of each CLASS per 1,000 of E. on D.

TALAKUS.	TOTAL.	Infants under 1.	Children 1 to 12.	Adults 12 to 50.	Old People over 50.
Sángola - - -	92·663	379·429	108·318	53·491	187·537
Mádha - - - -	245·152	580·145	248·678	216·136	226·869
Mán - - - -	171·725	507·897 (gain.)	87·035	139·426	430·381
Khatau - - -	153·144	144·076	143·435	127·656	366·515 (gain.)
Bágalkot - - -	169·292	579·207	283·338	126·931	87·914
Bádámi - - -	254·117	747·839	294·780	186·852	380·237
Athni - - - -	187·109	590·847	156·827	152·102	207·315
Sampgaon - - -	98·780	380·118	120·747	61·094	87·905
Ron - - - -	127·640	592·270	165·866	47·571 (gain.)	273·796 (gain.)
Kod - - - -	41·589	274·845	168·904	4·741	287·288

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TABLE (G.)—PROPORTION LOSS per 1,000 of each CLASS bears to DEATH-RATE of same CLASS for 1877.

TALUKAS.	Infants under 1.	Children 1 to 12.	Adults 12 to 50.	Old People over 50.	Loss per 1,000 of Population.	Recorded Deaths per 1,000.
Sángola - - -	2·54	3·76	2·08	1·49	92·66	66·66
Mádha - - - -	3·88	8·65	8·43	1·80	255·15	41·80
Mán - - - -	3·46	3·02	5·43	3·42	171·72	65·25
Khatau - - -	+·97	4·98	4·97	2·91	153·14	50·62
Bágalkot - - -	3·87	9·86	4·95	+·69	169·29	95·72
Bádámi - - -	5·00	10·25	7·28	3·02	254·11	104·31
Athni - - - -	3·95	5·46	5·93	1·64	187·10	75·72
Sampgaon - - -	2·54	4·20	2·38	·69	98·78	70·92
Ron - - - -	3·96	5·77	1·85	2·17	127·64	106·79
Kod - - - -	1·84	5·87	+·18	+2·28	41·58	70·46

Note.—In the case of Ron, it is possible that the figures may be explained by a migration of children and adults *out of* the taluka in one period, and of adults *into the* taluka at another. In the case of Kod, the same remarks apply, except that the figures show migration of old people as well as adults *into the* talukas.

THE NORTH WESTERN PROVINCES.

EXTRACT from a DESPATCH from the Government of India to the Secretary of State for India (No. 49), dated 3rd June 1878.

Para. 9.—THE returns of mortality for the North Western Provinces show that during the past months the death-rate has been very much higher than usual. The average death-rate for the whole of the North Western Provinces and Oudh has been, during—

November 1877 - -	1·99	per mille, as compared with a rate per mille in the previous year of—	1·79
December „ - -	2·77		1·59
January 1878 - -	3·27		1·20
February „ - -	3·30		1·05
March „ - -	3·36		1·46

The Lieutenant Governor, when remarking on this mortality, considered that many who had been reduced by want must have succumbed to the cold and damp of the present unusual season. He deplored the unreadiness of the people to come to the relief works, which are open or are ready for them. This difficulty has been felt in other Provinces, where relief works are really supervised, and a fair tale of work is exacted at low rates of wage from the relief labourers. If, unhappily, distress in parts of the North Western Provinces should deepen into famine, it will be necessary to organise arrangements for hunting up the distressed people in their villages.

10. Though high prices and want must have had their share in causing the increased rate of mortality in the North Western Provinces, there is ground for believing that the season has been unhealthy in parts of India not affected by the scarcity. In 22 towns of the Central Provinces, where the registration of deaths is held by our Sanitary Commissioner to be comparatively well done, the death-rate of the past season has been abnormally high; thus the death-rate was, during—

January 1878 - -	2·52	per mille, as compared with a rate per mille in the preceding year of—	2·2
February „ - -	2·40		2·1
March „ - -	3·80		2·3

In the Central Provinces, though prices were high, there was no scarcity of food; and the late Sanitary Commissioner, Dr. S. C. Townsend, has pointed out that the mortality from fever, which usually falls almost to zero in February, has this year continued extraordinarily high.

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EAST INDIA (FAMINE).

COPY of PAPERS relating to the PARTIAL CENSUS in the FAMINE-STRICKEN DISTRICTS of INDIA.

(*Mr. Edward Stanhope.*)

Ordered, by The House of Commons, *to be Printed,*
18 *July* 1878.

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Under 6 *oz.*

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REPORT

ON

SANITARY MEASURES IN INDIA IN 1876-7

TOGETHER WITH

MISCELLANEOUS INFORMATION UP TO JUNE 18

VOL. X.

Presented to both Houses of Parliament by Command of Her Majest

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REPORT.

I.—EUROPEAN ARMY.

The health statistics of the European Army in India during 1876 were as follows :— Sickness and mortality in 1876.

Per 1,000.

—	Admissions.	Daily Sick.	Deaths.
Bengal - - -	1,443·4	58·0	16·02
Madras - - -	1,131·0	55·4	15·77
Bombay - - -	1,317·0	53·0	12·30
Army of India - -	1,361·5	56·6	15·32

The total death-rate showed a marked reduction on that of 1875, which was 17·48. In the Bombay Army it fell from 20·92 to 12·30. The Madras rate was a little higher than the rate of the previous year (14·85). Considering the prevalence of epidemic disease among a famine-stricken population throughout a great part of the latter Presidency, the health of the troops there was very satisfactory. Contrasted with the previous 18 years, the average daily sick, admissions, total deaths, and deaths from cholera were all below the average.

Malarial fevers and venereal diseases were, in all the Presidencies, the principal causes of sickness. Hepatic and gastric affections were, as usual, much more prevalent in Madras than in the other Presidencies.

The total deaths from cholera were:— Cholera.

—	1875.	1876.
Bengal - - - -	136	115
Madras - - - -	4	17
Bombay - - - -	54	2
Total -	194	134

A full account of the prevalence of this disease will be found at page 49. More than half of the total cholera mortality in Bengal occurred at Peshawur and Murree; at the former 39 deaths, and at the latter (a hill station) 29, took place. Of 34 cases in Madras the principal portion occurred in a small party of recruits and others proceeding to Wellington from Bombay and intermediate stations. In Bombay, cholera, which headed the list in 1875, stood nearly at the bottom in 1876.

Twenty-two cases of small-pox were treated, of which none were fatal. Small-pox.

There was more sickness, but less mortality, from malarial fevers than in the preceding year. Fevers.

In the whole Army 264 cases occurred of enteric fever, 105 of which ended fatally. In 1875 the numbers were respectively 166 and 84. The prevalence of this disease at the hill stations is said to be increasing. Of 49 cases in the Madras Presidency, 38 took place at Secunderabad; an investigation into the conditions which led to this result proved unsuccessful. At Cannanore and Bangalore, which were formerly notorious for enteric fever, there was none during 1876. In Bombay the disease prevailed epidemically in a battery of artillery stationed at Neemuch. It was attributed to a foul latrine belonging to the old barracks; this was in consequence abandoned, and the battery moved into the new barracks, which were at the time approaching completion. The battery arrived in India in March 1875, and of the 13 men attacked 10 were under 25 years of age. The symptoms of the fever led the medical

NOTE—The health statistics of the European Army are fully treated in the Sanitary Commissioner's Report (*see* Abstract, p. 45); and information regarding one principal cause of inefficiency will be found under *Lock Hospitals* (p. 21).

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officer in charge to regard it, not as exactly equivalent to the enteric fever met with in temperate climates, but as complicated with and modified by malarial poisoning. Poona, Mhow, and Nusseerabad also had several cases. At the former station 10 men were admitted from one battalion. The medical officer in this case remarked that there are two types of the disease as seen in India, "the usual continued type, occurring in fresh arrivals in "the country, and the remittent type, occurring in those who have been in the country some "time; * * there is no doubt it is owing to the malarial influences to which the individuals "have been subjected that the disease assumes this remittent character."

Drunkenness.

The statistics of intemperance among European soldiers were on the whole more favourable. The number of cases reported in Bengal, which in 1874 was 10,988, fell in the two succeeding years to 8,926 and 7,136; but the number of total abstainers was 20 per cent. less in 1876 than in 1875. In Bombay, with an improvement, though slight, in regard to drunkenness, there was an increase of 22 per cent in the number of abstainers. In Madras, on the other hand, there was an increase of drunkenness, and also an increase of over 40 per cent. in the number of abstainers.

The Army Sanitary Commission consider that 264 out of the total number of 886 deaths in the whole of the European Army must be ascribed, directly or indirectly, to the effect of intemperate habits.

Invaliding.

The loss by invaliding was less than in any of the five previous years; the ratio per 1,000 sent home for change was 29·67, and for discharge 9·23. In the Madras Army the diminution under the former head was very marked, but the number for discharge was greater than in 1875. The results in Bombay were not satisfactory, the numbers being high as compared with previous years.

Transport service.

The importance of embarking troops for India so as to arrive there during the cold season has been pressed on various occasions by the Army Sanitary Commission. The statistics of the trooping season 1876–7 were very satisfactory in this respect. Of 8,142 men embarked, 5,139 reached Bombay not later than January, and all but two before the end of March. Of 2,220 invalids sent back to England, only 792 arrived earlier than April, and the rest during a milder part of the year.

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II.—NATIVE ARMY.

In the following table the admissions and deaths in the Bengal Native Army during 1876 (exclusive of Madras troops) are compared with those of the preceding ten years, the ratios of admissions being calculated on the average strength present, and those of mortality on the total strength:— Bengal Army.

	Per 1,000.	
	Admissions.	Deaths.
1866	1,205·	17·5
1867	1,312·	17·8
1868	1,118·	16·5
1869	1,625·	24·9
1870	1,598·	18·6
1871	1,331·	18·3
1872	1,526·	20·1
1873	1,323·	17·4
1874	1,329·	13·1
1875	1,287·	16·3
Average	1,365·4	18·0
1876	1,404·7	14·7

The statistics for the four divisions of the Army were as follows, for two years:—

	Per 1,000.			
	1875.		1876.	
	Admissions.	Deaths.	Admissions.	Deaths.
Regular Army	1,230·3	15·6	1,423·1	15·4
Central India Force	919·8	9·6	874·1	9·3
Punjab Frontier Force	1,672·4	21·7	1,567·5	14·8
Army of Bengal	1,287·5	16·3	1,404·7	14·7
Madras Troops	897·7	14·2	1,048·7	12·3

There was thus a great increase of admissions in the Regular Army by the side of a decrease in those in the Central India Force and the Punjab Frontier Force, and also a marked decrease in the general death-rate. This circumstance is not explained. The unhealthiness of certain stations for sepoys recruited from the Upper Provinces and Oude is, however, enough to account for a higher admission-rate. The death-rate was a very favourable one, particularly when the great differences in climate and other respects of the many stations in this large Presidency are taken into account. "It will," the Surgeon-General remarks, "doubtless be "accepted as an ample proof of the excellence of the conditions of service, and of the "constant attention paid to the sanitary arrangements of cantonments, as well as to every "question which bears either on the efficiency or general welfare of the Army."

More than half of the total admissions were caused by fevers, which were unusually prevalent in the Presidency, Eastern Frontier, Meerut, Lahore, and Rawul Pindee commands. From this cause arose 23 per cent. of the total mortality. The dependence of pneumonia on defective clothing and dietary having been pointed out on various occasions by the Army Sanitary Commission, the matter has received attention in India, with the result of a decided reduction in chest diseases during 1876. Of 163 cases of cholera, 88 proved fatal.

NOTE.—The figures in this Section are taken from the Surgeon-Generals' returns, not from the Sanitary Commissioners' Reports.

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Madras Army.

In the Madras Army the admission-rate was 769·2, and the death-rate 13·8, per 1,000, while the invaliding rates were, for discharge 32·9, and for sick leave 21·1. While the admission-rate has gradually declined since 1872, there has been an equally steady rise in the rates of mortality and of discharge since 1873 in the former case and 1872 in the latter, so that it would appear that sickness, though less frequent, has been more serious in its effects. It is found, as a general rule, that the death-rate is lowest amongst Mahomedan sepoys, which is thought to be due to their universal use of animal food.

The year was marked, in the Presidency, by widespread and fatal epidemics of cholera and small-pox. In the Native Army, however, there were only 103 cases of the former disease, with 57 deaths, and of the latter 84 cases and one death.

Malarious diseases were more prevalent in 1876 than in the two preceding years, and to them was due at least half of the total mortality. Among the causes of invaliding for discharge, rheumatic affections headed the list.

Bombay Army.

The death-rate in the Bombay Native Army during 1876 was 13·1 per 1,000, against 12·2 in 1875, and 10·9 in 1874. In the Sind Division the rate was as high as 31 per 1,000. The admissions to hospital also increased considerably, these unfavourable conditions being principally due to the greater prevalence of malarious fevers, especially amongst the troops of the Sind Division. In this part of the Army there was also a large increase of admissions for rheumatic affections, lung and bowel diseases, and cholera. The general health of the troops in the other divisions was fair.

The total number treated for malarious fevers was 12,528, out of a strength of 22,583. The stations which suffered most from this cause were Poona and Mehidpur; at the former the evil lies mainly in the condition of the lines, and at the latter in the faulty selection of the site. Cholera appeared in all the divisions; 112 cases were treated, 53 of them proving fatal. Of these, 96 cases and 46 deaths occurred in the expeditionary force sent to Khelat. In the previous year cholera was confined to the Poona and Northern Divisions; 120 cases having been treated, with a mortality of 71.

There were 57 cases of small-pox, with only one death. Considering what a virulent epidemic of small-pox raged among the civil population of the Presidency during part of the year, the comparative immunity of the Army from the disease speaks well for the manner in which protective measures were carried out by the medical officers.

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III.—GENERAL POPULATION.

The following statement (which may be compared with that given in the last volume for 1875) shows the recorded mortality in the different provinces from the four principal death causes :— Mortality from chief diseases.

1876.

Provinces, &c.	Cholera.		Small-pox.		Fevers.		Bowel Complaints.	
	Total Deaths.	Ratio per 1,000.	Total Deaths.	Ratio per 1,000.	Total Deaths.	Ratio per 1,000.	Total Deaths.	Ratio per 1,000.
Bengal (excluding Calcutta) -	196,590	3·27	10,746	·17	561,530	9·86	58,701	·97
Calcutta - - -	1,851	4·30	71	·16	4,361	10·15	1,864	4·33
Madras - - - -	148,193	5·08	23,469	·80	230,092	7·89	38,176	1·30
Bombay - - - -	32,117	1·90	11,817	·70	220,833	13·08	33,683	1·99
Punjab - - -	5,736	·33	10,254	·59	351,286	20·09	27,271	1·56
North-West Provinces - -	26,304	·85	35,174	1·14	495,469	16·10	88,850	2·88
Oude - - -	22,007	1·84	5,556	·47	162,761	13·61	7,367	·61
Assam - - - -		2·26		·38		4·63		1·12
Central Provinces - -	20,124	2·71	3,819	·51	149,786	20·22	19,952	2·70
Berar - - - -	2,683	1·22	415	·19	39,875	18·25	16,388	7·50
British Burma - -	3,678	1·28	1,335	·46	24,728	8·62	5,269	1·83

The low fever death-rate of Assam must, the Army Sanitary Commission point out, be the result of defective registration.

The year was distinguished in Bengal by a very sensible advance in the registration of vital statistics. In the number of deaths registered there was a total increase of 383,296, the ratio per 1,000 being 16·40, as compared with 10·01 in the previous year. The greatest portion of this increase occurred in the rural circles, where improvement is most needed. It is also observable that the improvement was general throughout the province. The system had begun to be so far appreciated that the records are stated to have been appealed to in courts of law. Registration was carried on in certain villages under the auspices of a native zemindar with apparently satisfactory results for three years. Bengal.

The system of registration in selected circles was largely extended during the year; and in these circles, while the towns showed an advance from 29·27 to 32·98, the death-rate in the rural areas declined from 20·72 to 19·11. It is argued from this that the increase of the general death-rate was due to improved registration, not to any increased general unhealthiness of the province.

The Government of Bengal have now abolished the system just adverted to. It was shown in the last Report (p. 5) that the sanitary authorities were opposed to its continuance, on the grounds (1) that the main object of registration as an index to the sanitary condition of localities is not attained under that system, and (2) that it tends to the undervaluing and possible neglect of general registration. The Government were at that time in favour of carrying on the scheme; but the deterioration of the results in the "selected" rural areas, while general registration has from the beginning shown steady advancement, has convinced them of its inutility. There are, moreover, said to be strong grounds for believing that the more favourable results generally shown in the selected circles are sometimes artificially produced; in one case the Civil Surgeon's clerk was found to have drafted a circular informing the police that the Sanitary Commissioner was not satisfied with the number of deaths, and that they must make the people die faster.

The measures referred to last year for the improvement of general registration were pressed forward energetically during 1876.

At Serampore a scheme was brought into operation which the Sanitary Commissioner observes ought to be introduced into all municipalities. The registrars have been directed to grant a certified copy of the entry of every birth or death registered to the parent or nearest relative. The plan involves very little labour and no expense. The people, when they come to understand the matter, will be glad to have these certificates that their births and deaths have been registered, as their absence must indicate neglect. In time the certificates will also be appreciated as valuable evidence in law courts.

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The death-rate of Calcutta, calculated on the census of 1876, was 30·18 per 1,000; excluding Fort William and the Port, it was 31·2 per 1,000. But, owing to the special circumstances of the population, the ratio cannot be represented with accuracy, at least as an index to the sanitary condition of the city, for many deaths due to residence in the city actually occur beyond its limits, in the case of migratory labourers and artisans, and domestic servants whose families do not live with them in Calcutta.

The death-rate in the Fort was 4·1 per 1,000 for males, and 5 for females. The rate among the troops having been in former times 102 per 1,000, as recalled by the Army Sanitary Commission (*see* p. 179), it may be judged how much has been done for their sanitary well-being. The European quarter of the city is shown by the statistics to be very salubrious, and the climate distinctly favourable to European life.

Births were registered during the year under report, for the first time, in the general circles of the province.

Cholera was present during every month, and prevailed with more or less intensity in every district. It caused 196,590 deaths, making 20 per cent. of the total mortality. The increased number of deaths must be partly ascribed to improved registration, but it was also partly due to the greater fatality of the disease in some localities, and especially in those whose water-supply was contaminated in consequence of the great cyclone inundation. Altogether the principal cause of cholera mortality was shown to be an insufficient and impure water-supply. On the other hand, cases are reported illustrating the favourable effect of good drinking water. This is very apparent in the immunity of Europeans residing in the tea-gardens, and in centres of pilgrimage, when cholera is prevailing among the natives all around them. The habits of the "Mughs" appear to form a remarkable contrast to those of the general population; they will walk five miles to obtain pure spring water.

Small-pox, on the whole, showed diminished virulence and fatality. In several localities, however, there were severe outbreaks; and there, as a rule, the Act prohibiting inoculation was not in operation.

The proportion borne by fever mortality to that from all causes was 56·55 per cent., which, however, was less than in the preceding year. The special fever of the Burdwan district is referred to as "a thing of the past." In Beerbhoom the type of the fever generally prevalent was in every respect identical with malarious fevers that prevail elsewhere, with the exception that there was more marked prostration and a greater tendency to congestion of internal organs. The epidemic fever continued to prevail in Midnapore, but with much less intensity; and in Hooghly it did not appear in severe form.

The mortality from bowel complaints, after making allowance for improvement in registration, is estimated by the Sanitary Commissioner to compare favourably with previous years. The greatest prevalence was in Orissa, where, Dr. Coates observes, "any one who "has watched pilgrims in their long march, and has observed the sufferings, privations, and "exposures they endure, will not wonder at the great prevalence of cholera and bowel com-"plaints among them."

Dr. Coates remarks on the immunity in the present day of Europeans in India from disorders of this class, which he attributes to the cessation of the old habits of reckless exposure to sun and rain, heavy tiffins, midnight suppers, and strong liquor drinking. "Ladies," he says, "are less pale, thin, and lethargic, more muscular and firmer, more "energetic, healthier, and happier, since croquet, badminton, and lawn-tennis have given "them some real out-door exercise;" and "altogether Europeans are freer from disease, "longer lived, and healthier, than the great majority of the natives themselves."

Madras. The effects of the scarcity in Madras began to be felt in the latter part of the year under review, but the subject belongs mainly to a later period. The total registered death-rate was 23·3 per 1,000. The epidemic of cholera which had raged in the previous year continued through 1876; in fact, a far larger number of deaths occurred from this cause than in any year since 1866. "In this second year of its progress," the Sanitary Commissioner observes, "cholera "has, no doubt, been aggravated by the abnormal seasons and general scarcity of food, and "in some degree also by the aggregation of the people on famine relief works." To this disease 148,193 deaths were attributed; to bowel complaints 38,176; to small-pox 23,469; and to fevers 230,092; the figures under the two latter heads showing improvement. To deaths from bowel complaints should probably be added a great number erroneously classed under "other diseases."

Of the small-pox deaths the greatest number occurred in March, after which the mortality declined steadily to its lowest point in October, and then again began to rise.

The mortality in the town of Madras during the first three months of 1877 was:—

January	-	4,059 deaths.
February	-	4,401 „
March	-	4,953 „

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the ratio for the quarter, calculated on the census population of 1871, reaching the enormous figure of 134·8 per 1,000 per annum. A large portion of the rise in March was due to small-pox, which numbered in that month 1,682 victims, against 893 in February. From bowel complaints, including what Mr. Cornish designates "the fatal diarrhœa of famine," there were 966 deaths in February, and 994 in March. Cholera was also very prevalent; with regard to which a special health officer appointed in connection with the famine remarked: "I am "not at all surprised at the increase of cholera; the water-supply is failing everywhere, and "that from the Red Hills is very offensive, and in every little bazaar a large quantity of "unripe green mangoes are being sold."

Bombay.

In calculating the birth and death ratios of 1876 in the Bombay Presidency, an increment of 1 per cent. per annum has been assumed on the recorded population. This is an unsafe proceeding, and vitiates comparison with the statistics of other parts of India. Based, however, on this assumed population, the birth-rates for 1875 and 1876 would be respectively 20·01 and 20·46, and the death-rates 22·11 and 21·81. In the capital the death-rate was 30·66; or, judged by the census of 1872, 32·25.

Cholera was the cause of 32,117 deaths,* the mortality in the previous year having been 47,555. The epidemic must be regarded as a continuation of that of 1875; and the Sanitary Commissioner reported that at the close of 1876 the disease appeared to be again becoming rapidly more fatal.

The deaths from small-pox numbered 11,817, or 8,356 more than in the preceding year. As in Madras, this disease reached a climax in March, then gradually falling until September, after which the mortality again increased, until in December it attained the highest point for the year. This experience appears to be very different from that in the northern parts of India, where it seems to be essentially a hot-weather disease (*see* Vol. IX. p. 46.) In the city of Bombay small-pox prevailed as an epidemic, causing 3,174 deaths, of which 2,666 were those of children. It is believed to have been much aggravated by habits of crowding and want of ventilation.

The number of fever deaths (220,833) is the highest on record. The mortality from bowel complaints (33,683) varied but little from that in the preceding year.

Hereditary syphilis is said to be increasing in an alarming manner both in the capital and in the Presidency generally (*see* pp. 20 and 122.)

Punjab.

The mortality recorded in the Punjab during 1876 was higher than in any previous year since registration was introduced, the total deaths amounting to 496,844. The increase, as compared with the mortality of 1875 (when there was likewise a great accession of deaths from the same cause), occurred wholly under the head of "fevers," which caused 351,286 deaths. The province was comparatively healthy up to the end of August, and then a most destructive epidemic of fever broke out in various districts, reaching its climax in October, when the total death-rate stood at the appalling figure of 208 per 1,000. During the week ending 7th October there were 20,254 fever deaths.

The deaths from cholera during each month were as follows:—

January	4	July	1,096
February	7	August	1,396
March	2	September	1,421
April	6	October	1,277
May	8	November	280
June	236	December	3

The cholera of 1876 must, no doubt, be regarded as a continuation of the epidemic of the previous year, but the areas affected were for the most part distinct. In 1875 the disease was limited to the districts eastward of Lahore and Lahore itself, excepting only the district of Sialkot, in which it appeared last. In 1876, with the exception of unimportant outbreaks in some localities, it was confined to Lahore and the districts to the west of that town.

The following table shows the favourable diminution of small-pox mortality as compared with former years:—

1869	53,195	1873	25,699
1870	27,163	1874	12,026
1871	25,534	1875	13,594
1872	23,728	1876	10,254

The disease was most severe in the months of March, April, May, June and July; 6,847 deaths alone out of the total of 10,254 having occurred in these months, of which 6,508 were amongst children under ten years of age.

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* A monthly table of deaths will be found at p. 102.

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From bowel complaints 27,271 deaths were registered. The Sanitary Commissioner has reason to believe that it is a mere matter of chance whether the victims of malarious fever and of bowel complaints are registered under the one head or the other. The latter class of disease he considers is more connected with exposure to chill than with any other cause; and he observes: "Until the people are taught to clothe themselves in a manner calculated to "protect their bodies from the effects of sudden atmospheric changes, and to build their houses "in a manner to exclude night air from pouring in upon the occupants like water from a spout, "as it were, it is hopeless to look for any material improvement in their proneness to such "diseases, be other sanitary measures carried out to such perfection as they may."

The registration of deaths in the Punjab is marked by considerable energy, and the police authorities in those districts display much interest in the matter. The death-rate for the rural population during 1876 was 26, and for the urban 46.

Birth registration was also on the whole satisfactory. The under-mentioned municipalities showed a birth-rate of above 50 per 1,000, viz., Rewaree, Ferozepore and Palwal, in Gurgaon district, Delhi and its suburbs, Shahpur, Sahiwal, Bhera, and Khushab, in the Shahpur district. In 78 municipalities out of a total of 180 the birth-rate was 35 and upwards.

North-West Provinces.

Registration in the North-West Provinces appears to be as efficient as in any part of India.

The Lieutenant-Governor having expressed his opinion in favour of the limitation to towns of the area of death registration, it was pointed out to him by the Government of India that registration is the best foundation for sanitary progress, and that the object to be attained, although attended with difficulty, is worth the effort which the Government desire should be made. "Very substantial improvement," it was observed, "has been effected in other "provinces, possessing no better administrative machinery, without difficulty and without "any special agency. The curtailing of the area of death registration would be a very "retrograde step. Though the registration of deaths in the North-West Provinces and "Oude has not yet attained any great degree of accuracy, the information which it has "furnished, even in its imperfect condition, has been of great value in studying the history "of epidemics, and forming practical deductions on this important subject."

The recorded death-rate of 1876 was 23·39 per 1,000. In 66 town circles the average rate was 32·47; the difference being probably due to the more careful registration in towns. Really aged persons are very rare in the province, the result apparently of the hard life led by the mass of the population.

The cholera deaths for three years were:—

1874 - - - -	6,396
1875 - - - -	41,106
1876 - - - -	26,304

The epidemic prevalence was confined to the eastern districts adjoining Bengal, and to certain districts of Rohilkund, especially Bareilly; and a very considerable mortality from this cause occurred in Kumaon. Cases were reported from 3,281 out of 91,274 centres of population; and of these, 2,240 showed less than five deaths each, and only 163 more than 20 deaths. Mr. Planck believes there can be no doubt that these 163 centres are those in which serious mortality from cholera occurred during the preceding year; and he adds that the necessity is apparent of sanitary improvement in the places affected.

There were 352 deaths from small-pox. It prevailed to a serious extent only in Bundelkund, Rohilkund, and two northern districts of the Doab.

Fever was unusually prevalent and fatal. Of the total death-rate, 16·10 was assigned to this cause alone. The Terai district, a moist country of excessive vegetation, heads the list; next comes Cawnpore, which Mr. Planck observes is a new experience, and which he attributes to excessive canal irrigation. On the other hand, he connects the gradual decline in the fever mortality of the Upper Doab districts with two causes,—the gradual acclimatization of the inhabitants to the changes brought about by canal irrigation, and the improved drainage of the land. As to the first of these causes, however, the Army Sanitary Commission call attention to the fact that, while "there is acclimatization to heat, there is none to endemic "miasmata."

The districts chiefly affected by bowel complaints were, with few exceptions, those similarly affected during the past six years.

The year was remarkable for an outbreak of the "mahamurree" disease, which appears to be to some extent endemic in Kumaon and Gurhwal, and of which previous outbreaks occurred in 1836 and in 1849–50, resulting in 633 and 110 deaths respectively. In 1876 there were 287 deaths reported. Surgeon C. Renny, who investigated the disease in 1850, came to the decided conclusion that it was not "plague," but a malignant form of typhus fever. Mr. Planck thinks that it is identical with the plague of Egypt and the Levant;

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it does not however, he observes, show any tendency to spread epidemically, but is restricted in locality. The great predisposing cause is undoubtedly the unwholesome condition of the houses, which are utilized as granaries and as cowsheds, producing a vitiated state of atmosphere within and around. Therefore the only reliable method of prevention is an improved sanitary management of the houses and homesteads throughout the country; while the remedy in cases of outbreak is to remove the people of an infected house into the open air, and to burn out the house.

The Army Sanitary Commission observe on this subject: "It is not necessary to discuss "whether every case of mahamurree is a case of true plague. One thing appears to be shown "by all the accounts, namely, that the disease is one of intense blood poisoning. * * * "No such disease ought at the present day to exist. Its nature, causes, and means of preven- "tion are known, and there ought to be no difficulty in abolishing it."

Cholera in Oude was almost as fatal as in the preceding year. The monthly distribution showed, however, great variations, as will be apparent from the following comparative statement:— Oude.

——	1875.	1876.
January	0	44
February	56	13
March	824	25
April	8,726	677
May	4,206	4,892
June	2,137	8,907
July	1,050	3,979
August	979	1,606
September	1,636	1,070
October	1,856	478
November	862	286
December	989	30
Total	23,321	22,007

Scarcely any information has been received respecting other diseases, and that is invalidated by the extremely defective state of registration.

An improvement appeared in the registration of births in the Central Provinces, the rate being 39·39, against 35·35 in 1875. A greater approach was made to what may be considered the normal proportion of male and female births. The results in rural circles are found to be better than in towns, which probably is owing in part to the fact that in villages every birth occurring is known without being specially reported. There appears, however, to be great negligence in this matter on the part of municipalities, which have compulsory means at their disposal. Central Provinces.

The death-rate was 30·38, against 26·32. In some districts there was a great advance in the rate, while others showed a falling off. Jubbulpore town had a rate of 59·74, and Seoni of only 17·49; in the former there was a large accession of cholera and of fever deaths, while those from bowel diseases were doubled. In Nagpore city there was an increase of 13·46 on the rate of the previous year, which is believed to be to a great extent due to more efficient registration.

Cholera, which prevailed epidemically in 1875, extended itself still further during 1876. The total number of deaths was 20,124. Every district was affected except Burhanpur; in Bilaspur one fatal case only was reported. The most afflicted district was Nursingpur: the cholera death-rate there amounted to 12·35 per 1,000 of the population, while in the town of Gadarwara it was as high as 38·72. The Chanda district stood next in point of mortality.

While cholera was thus generally diffused throughout the province, yet only 1,967 out of 27,180 groups of population were affected—another demonstration of the fitful character of the disease. There is no evidence as to how far the local attacks were connected with insanitary conditions; but there can be no doubt that there was some such connection in the case of the Nagpore district, where a steady decline of mortality from August to October received a sudden check in November, during which month a fair was held at Ramtek. On the other hand, Nagpore town was an illustration of the advantage of a pure water-supply: there the death-rate from cholera was 0·72 per 1,000 of the population, while the average rate in towns was 6 per 1,000.

An epidemic of small-pox, which commenced in 1871, and culminated in 1875, when the deaths numbered 20,226, rapidly declined in 1876, during which year there were only 3,819

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deaths from this cause. All these deaths, except 667, were in children under 12. Those districts are clearly shown to have suffered least which were protected by vaccination.

The registered deaths from fevers were 149,786, the highest mortality yet recorded. The increase, while partly accounted for by the meteorological conditions of the year, was probably due in great measure to defective registration in former years. On the other hand, this head of disease continues to be credited with a large number of cases not properly belonging to it. The death-rate from "all other causes" was, for rural districts 3·24, and for towns 3·78; whereas for jails (where registration is of course trustworthy) it amounted to 24·0; the great discrepancy being in all probability connected with the fact just mentioned.

Berar.

Certain rules for the better registration of vital statistics in Berar came into force on the 1st March 1876. Under these rules the Civil Surgeons became the district registrars, and they are responsible for scrutinizing the returns received from the rural circles, and for rendering to the Sanitary Commissioner monthly and other statements showing births and deaths.

The registered death-rate of the year was 31·9, calculated on the census taken in 1867.

Cholera, which in the preceding year had raged in this province with exceptional severity, prevailed epidemically in 1876 also. The Sanitary Commissioner regards the cholera of the latter year as a revitalization of the invasion which began in the year before. As in 1875, it entered the province in the month of May. Its progress in the two years is compared in the following table of deaths:—

	1875.	1876.
May	249	19
June	3,625	109
July	10,374	142
August	5,840	469
September	2,007	662
October	318	720
November	52	410
December	0	152
Total	22,465	2,683*

* To this figure should be added about 900 deaths improperly registered, making a total of (say) 3,583 cholera deaths.

In 1875 both the advance and the decline of the epidemic were rapid, whereas in 1876 they were slow, and it will be observed that the culminating point was reached in July in the former year, and in October in the latter.

It is remarkable that, although the cholera of 1876 was as generally diffused as that of 1875, the invasion in the latter year caused seven times more mortality,—indicating, Dr. Abbott observes, "that the first tide of the epidemic had cleared away most of those susceptible of the disease."

There were only 415 deaths from small-pox, less by 512 than in the previous year, and the lowest figure on record; yet this disease was more wide-spread over the province than it was in 1875.

Fevers accounted for 57 per cent. of the total deaths; and bowel complaints† continued to be a very serious cause of mortality. The latter circumstance is considered by the Resident to be probably attributable, in a great measure, to the drinking of impure water. "It is "lamentable to think," he says, "that good drinking water is so scarce in the province; "there is no question so full of importance, and unfortunately of discouragement also, as "this—discouragement all the more disheartening because of the indifference of the poorer "classes generally as to the quality of the water they drink. It is difficult to see what "Government officers can do in the matter beyond what has been attempted, or at least "directed. The Resident trusts that the Sanitary Commissioner's figures will stimulate "exertion on all sides with the object of preventing, as far as possible, the many causes of "contamination to water-supply which the habits of the natives of Indian towns and "villages tend so largely to multiply, and which there is no hope of their removing if left to "themselves. * * * Do what we will, we can never eradicate the evil, or perhaps a "tenth part of it; but even a tenth represents a very large sum in human life and "health. * * * Sir R. Meade feels he may count on the best efforts of his officers with "this object, and he is glad to observe the Sanitary Commissioner again bears testimony in "the present Report to the fact that such efforts are not neglected."

† On the connection between these two classes of disease, *see* Vol. IX., p. 46.

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The Government of India have ordered the institution of enquiries with a view to comparing the position, soil, and nature of the sources whence the water-supply is drawn in places where the death-rate from bowel complaints is excessive with the like conditions in places where it is not above the average rates of other provinces.

British Burma.

The recorded deaths in British Burma during 1876 were in number 42,401, being 2,031 more than the number of the previous year, and at a rate per 1,000 of 14·79.

Cholera was more fatal than in any year since the beginning of registration, the mortality being 3,678, as compared with 761 in 1875. It prevailed severely, however, only in the towns of Akyab and Prome (the sanitary arrangements of which are very defective), and in some villages of the Kyouk-hpyoo district. Beyond a few deaths at Moulmein and Tavoy, the Tenasserim division was quite free of the disease.

Deaths from small-pox rose from 752 to 1,335. The registration under fevers and bowel complaints produced very similar results to 1875.

Rajpootana.

Judging from the dispensary returns, there was nothing specially noteworthy in the health statistics of Rajpootana during 1876. Cholera only prevailed to any serious extent in the city of Bhurtpore, and in the months of August and September. It also broke out in two villages of Jhallawar, where the hospital assistant reported that the usual and best treatment practised by the villagers was cauterization of the stomach with a hot iron.

In the British district of Ajmere, the death-rate, calculated on the census of April 1876, was 21 per 1,000, which was very probably near the truth. Only 18 deaths were ascribed to cholera. The fever death-rate, 11 per 1,000, was no doubt exaggerated, although there is reason to believe, from the heavy and late rainfall of 1875, that there was an increase of mortality from diseases of the character of ague.

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IV.—JAILS.

Bengal.

The mortality among convicts in Bengal was generally very high, the average being 5·93 per cent. of strength, against 4·96 in 1875. Of 49 jails, 23 showed death-rates exceeding 5 per cent., viz. :—

Julpigoree	23·46	Durbhunga	8·66
Rungpore	17·96	Baraset	8·45
Chumparun	17·12	Bogra	7·68
Pubna	15·47	Shahabad	7·59
Backergunge	14·41	Burdwan	6·71
Hazareebagh	11·74	Russa (Female)	6·59
Sarun	11·44	Manbhoom	6·54
Lohardugga	10·00	Hooghly	5·27
Singhboom	9·84	Purneah	5·24
Patna	9·45	Rajshahye	5·23
Mozufferpore	9·20	Chittagong	5·04
Pooree	8·67		

The excess of unhealthiness as compared with the previous year was partly accounted for by cholera. In the following jails, however, (and also in ten others not included in the above list,) there were no deaths from this cause: Rungpore, Singhboom, Pooree, Baraset, Bogra, Russa.

In the cases of Pubna, Hazareebagh, Singhbhoom, Patna, and Pooree, the great unhealthiness was exceptional, not following the experience of late years. No explanation, however, is offered in the reports of the causes of this unfavourable condition, except in regard to Pubna, where it is stated that the wards were damp and ill-ventilated, and generally to some extent overcrowded.

The high rate of mortality was nothing new in the following cases: Julpigoree, Rungpore, Chumparun, Backergunge, and Mozufferpore. In the first of these instances the unhealthiness appears to be due to fault of site; in the second, to overcrowding and insufficient drainage; and in the case of Backergunge to defects in construction. The Lieutenant Governor fears that "for some time a high death-rate in Rungpore and Julpigoree jails at least must be accepted "as a necessity owing to the low rate of vitality which prevails among the poorer classes in "those districts." The Officiating Inspector General (Mr. Beverley) draws attention to the fact that all the jails situated in the Sub-Himalayan districts are more or less unhealthy,— "a fact which seems to indicate that the cause is to be sought in the physical conditions of "those districts rather than in the situation or management of the jails."

Most of the above prisons were more or less overcrowded at some time or other during the year. Seven others were also seriously overcrowded, but in none of them (except perhaps Alipore) does it appear to have affected the health of the prisoners.

The Surgeon General reports that much good was effected during the period under review by efficient drainage; greater attention to the ventilation, especially of the sleeping apartments; apportioning labour according to physical capability; the supply of a more suitable description of sleeping places, &c. But greater improvements in the aggregate can only be anticipated when some of the jail buildings are entirely remodelled, others done away with altogether, and new and well-ventilated structures raised in their stead in healthy localities better suited to accommodate and maintain in health the criminal population. At Julpigoree the jail has been abandoned, the prisoners have been removed to a new site on the bank of the Teesta, and estimates for temporary buildings have been sanctioned by Government. It was arranged that the Rungpore and Backergunge jails should be next taken in hand. Projects for new double-storied barracks in these jails were lying before the Government, but, owing to some delay in passing the estimates, nothing further was done during the year; the plans and estimates have, however, since been sanctioned, and orders issued for the commencement of the works. Sites were acquired for new jails at Chumparun and Gya some time ago, but nothing further has been done for want of funds. The death-rate at Gya showed much improvement during 1876.

Madras.

The statistics of Madras prisoners are given for all classes, not for convicts alone. The principal causes of admission to hospital were bowel complaints and intermittent fever. The

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general death-rate was 4·24 per cent., against 3·90 in 1875; the increase being chiefly due to cholera. In the central jails the rate was 2·94 per cent. only. More than half the whole number of deaths occurred during the first year of prison life.

The number of deaths in the Kurnool district jail was very high, and included 29 fatal cases of cholera. Other prisons which showed specially high death-rates were Tanjore, Calicut, Vizagapatam, Coimbatore (district), Madura, Chittoor.

Bombay.

The state of health in the jails of the Bombay Presidency was remarkably satisfactory. The general death-rate was 2·1 per cent., against 3·3 in 1875; excluding Sind, it was only 1·8 per cent. In only one case, that of Hyderabad, did the rate amount to 5 per cent., and there it was 5·6.

There was, nevertheless, much overcrowding, particularly in the southern districts, towards the end of the year, in connection with the scarcity of food. While throughout the Presidency the male accommodation, on the scale of 648 cubic feet per prisoner, was sufficient for 7,294 men, the actual daily average was 8,443. The absence of any marked effect on the general health is attributed to two circumstances, viz., that in many places the barracks are merely open cages allowing free perflation of air, and that in other cases the pressure was relieved by temporary recourse to tents and worksheds.

In several jails there was a marked decrease in admissions and deaths from intermittent fever; and there was also a general decrease under the head of "remittent and continued fevers," the only prison where a large number of cases was registered being that of Yerrowda; there only 3 out of 60 cases proved fatal, while at Hyderabad the number of fatal cases was 6 out of 7. In the Yerrowda central jail a considerable amount of sickness and mortality took place from diseases of the respiratory class, which is attributed in great part to excessive perflation.

Punjab.

The general death-rate of the prison population of the Punjab from all causes in 1876 was 3·66 per cent. of the daily average strength; this was 0·47 per cent. higher than the rate for 1875. Not only was the mortality greater in 1876, but there was very much more sickness than in the year before. In 1875 the admissions to hospital numbered 17,995, but in 1876 they reached 23,178.

The greatest number of admissions was from fevers; next came bowel complaints; then ulcers and boils. The mortality was chiefly due to dysentery and diarrhœa, although the admissions from these diseases were very much fewer than from fevers. The most fatal disease was phthisis; 35 per cent. of the patients who suffered from it died; but fortunately many did not suffer from it, and there did not seem to be any reason to attribute its origin to the conditions of prison life. Of 27 cases of cholera, 11 only were fatal.

With regard to the first of the above causes of sickness, the Inspector General remarks: "Every "attention is paid to the feeding and clothing of the men during the rains, the drainage of the "jails is constantly watched, and everything done we can think of to preserve the health of the "prisoners, but still they suffer in this wholesale way from intermittent fever. I have applied "for the sanction of Government to my using at Rupar, when the fever season comes on, the "preparation of chinchona manufactured at the Government factory, as a preventive, that is, "giving to every man a certain quantity before he goes to work of a day. If this be sanctioned, "and the experiment prove successful, I think it would be a good thing to try it generally; "and if it stops or materially lessens the prevalence of intermittent fever in our jails, the loss "of labor thus saved will repay the cost of the drug more than twice over."

The death-rate was above 5 per cent. in the following prisons:—

Hoshiarpur	10·81
Umritsur	8·89
Lahore (Female)	7·60
Ferozepore	6·02
Rupar	5·98

In the first of these cases, however, the rate is deceptive, as the daily average population was only 37, and there were four deaths, one of which arose from suicide.

In this year, as in the preceding, Umritsur jail suffered very seriously from fever. The Superintendent wrote:—"The general health of the prisoners, especially from July to December, "has been most indifferent. A large number of older prisoners from the preceding year, who "had passed through recurring attacks of fever, still remained; and these, together with "the more weakly of those admitted during the year, became at once chronically subject to "the malarial fever, which assumed epidemic proportions about August, to such an extent "as to present the spectacle of more than 60 per cent. of the jail population being down "with fever and unfit to work; and though hardly any deaths could be directly attributable

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" to the fever itself, its secondary enfeebling results made itself only too fatally seen in the " number of deaths which took place in October, November, and December."

Ferozepore jail also suffered severely from fever, although it had for some time past been specially healthy. In both these cases the fever was stated to be common to the surrounding country; and the Inspector General suggests that it may be connected with the rapid development of canal irrigation.

The jail at Peshawur continued in a very satisfactory state, the death-rate in 1876 being as low as 0·75 per cent.

North-West Provinces.

Taken as a whole, the health of the jail population in the North-West Provinces was good, the per-centage of deaths to average strength having stood at 2·5. The aggregate mortality in 33 jails amounted to only 1·7 per cent. The following jails showed a death-rate over 5 per cent.:—

Meerut Central	10·04
Banda	7·02
Meerut District	6·88
Mirzapore	6·28
Shahjehanpore	5·16

The first case on this list showed a relapse, the rate having been 12·83 in 1874, and fallen to 5·40 in 1875. A committee was appointed to investigate the causes of the sickness in the two Meerut jails.

The Banda jail having been transferred to the direct supervision of the magistrate or one of his assistants, better results are looked for in future.

Both at Mirzapore and at Shahjehanpore the high death-rates are partly accounted for by the number of old and infirm persons committed there. Of 16 who died in the latter prison, only 3 were in good health on admission.

The mortality in the Bareilly central prison, which during the previous five years had averaged 6 per cent., fell during 1876 to 2 per cent. of average strength.

The almost total absence of cholera from the jails was noteworthy. Notwithstanding its prevalence in many districts, only two cases occurred amongst the prisoners, one of which recovered.

Oude.

The prisons of Oude are, year after year, remarkable for their comparative healthiness. During the five years ending with 1875, the death-rate averaged 2·3; in 1876 it was only 1·3 per cent. These results are considered to be chiefly due to general management, including attention to food and the supply of good vegetables. In the Gonda jail, containing an average of 483 prisoners, there was not one death during the year. No death occurred from cholera, although it was epidemic in almost every district. The chief causes of mortality were dysentery and diarrhœa.

Assam.

The jails of Assam were mostly very unhealthy, as will appear from the following table of death-rates per 1,000 of strength:—

Goalpara	17·33
Tezpur	8·95
Dibrugarh	6·42
Silchar	6·30
Gowhatty	6·07
Seebsaugor	5·20
Sylhet	3·58
Shillong	2·94
Nowgong	1·23

These figures give an average death-rate during the year of 5·85.

The prevailing diseases were fevers and bowel complaints, the deaths from the former amounting to 13, from the latter to 51. The extreme prevalence of these diseases in Assam is due to the climate, and to the fact that many of the prisoners admitted are confirmed opium eaters.

One case of cholera occurred in the Dibrugarh jail. The other jails were free from this disease, although it prevailed among the general population to some extent.

With regard to the excessively high death-rate at Goalpara, it is stated that a certain proportion of helpless and pitiable pauper culprits, the victims of disease from insufficiency of food and clothing, and from exposure to the inclemency of the weather prior to admission, found their way into the jail. Owing to the faulty position and condition of this prison, it has, since the close of the year, been reduced to the status of a lock-up.

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The general death-rate in the jails of the Central Provinces was 4·11 per cent., which was a marked rise upon that of the preceding year (3·30). The statistics of sickness were much more unfavourable than those of mortality. At Raipore the death-rate was 6·28, at Jubbulpore 5·04, and at Nagpore 3·31. Some of the district jails showed considerable improvement. Central Provinces.

The chief causes of sickness were intermittent fever and bowel complaints; the latter were more prevalent than in 1875, and were the principal death cause.

The Inspector-General of Prisons attributes the comparatively unfavourable results of the year to its general unhealthiness, and also to the bad state of health of many of the prisoners on admission. He says, with respect to the three central prisons mentioned above:—"In "none of these jails has there been overcrowding, bad drainage, or defective conservancy, "while the food has been ample and varied at medical discretion, the drinking-water "excellent, the clothing sufficient, the supply of vegetables, except at Nagpore, apparently "constant, and the labour required of the prisoners not of a kind to injure health, being "decided by medical opinion in each case as to physical fitness. Each jail, too, has been "carefully inspected by superior medical officers, * * * and no important sanitary "defects of any kind have been brought to notice." And with regard to Raipore, in particular, he reports:—"The sanitary condition of the jail has been well attended to; the drainage is "good, no water accumulates in the barrack enclosures, purdas are fitted to all the iron-"gratings and doors; the clothing has been good, and the extra blankets, usually issued in "October, were issued in August; the diet is sufficient in quantity and varied; water-supply "good and ample; vegetables and anti-scorbutics given daily. The latrines are all clean. "* * * Though we have been unfortunate in having an increased mortality, I "cannot attribute it to want of hygienic considerations, but to many of those who have died "having been admitted in bad health, who would all the more readily succumb to the "lowering influence of jail life. Of those who died during the year, 11 were above 50 years "of age."

The Chief Commissioner expresses his concurrence in the view that the increased mortality was not due to defective sanitary arrangements in any of the jails. It is, indeed, he observes, a question whether the rate is really a high one compared with that among the general population between the same ages, which is not known with any accuracy. Averages calculated on small figures, moreover, hardly bear comparison with those based on large ones.

In the Assigned Districts jail administration generally appears to have received very careful attention of late years. In respect to accommodation and general sanitary condition the President says that there is little now left to be desired. Berar.

The number of deaths during 1876 was 21, being a percentage of 2·2 on the average number in confinement. Fifteen of the deaths took place at Akola.

As scurvy not unfrequently appears in Berar with the rains, the convicts in the large jails received vegetables daily in lieu of the quantity laid down in the scale, which is looked upon as a minimum; and in the Akola jail, in the vicinity of which cholera was present, the issue of jowaree was stopped, wheaten bread was served daily, and the allowance of salt increased.

The jail gardens at Akola and Oomraotee were well cultivated, and yielded an increased supply of vegetables, and the number of anti-scorbutic fruit-producing trees was added to.

The death-rate in the prisons of British Burma rose from 2·35 to 2·63, but the latter rate includes seven casualties which took place in the suppression of an outbreak in the Moulmein jail, and two other violent deaths, the elimination of which would reduce the figure to 2·44. An increase of mortality occurred under the head of cholera, of which there were 20 fatal cases, against 5 in the previous year. There was also much serious unhealthiness at Moulmein, both from fever and from hospital gangrene; the hospital had to be abandoned in consequence, and the floor replaced by one of hard earth, which was to be asphalted. At Rangoon some sanitary improvements were completed, comprising a new hospital and other buildings. British Burma.

The rate of mortality shown for the jails of Rajpootana averaged 5 per cent. of strength; for Bhurtpore it amounted to 12·8, for Oodeypore 7·5, for Jeypore 7·1, and for Dholepore 6·2 per cent. The death statistics of the general population are, the Government of India observe, too imperfect to admit of any opinion being formed as to how far this great mortality was the result of causes in general operation, or was due to insanitary conditions within the jails themselves. Rajpootana.

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V.—VACCINATION.

Bengal. The total number of vaccinations in Bengal during 1876–7 was 1,509,034, of which 340,305 were performed by dispensaries. The figures for the preceding year were 1,086,373* and 290,854 respectively. Of 1,492,373 primary operations 98·18 per cent. were successful; in Calcutta and its suburbs the ratio of success was as high as 99·9 per cent.

In several of the circles the people are now more favourably disposed towards vaccination than formerly, and in the metropolitan circle they frequently ask and pay for the services of vaccinators. The objection of the people to virus being taken from the arms of children is still a general complaint. It is hoped, however, that all opposition will gradually die out in course of time. In the Orissa and Ranchee circles the Superintendents had to encounter great difficulties, owing to the ignorance and prejudice of the people. The preponderance of females over males operated on in the Ranchee circle is explained by the circumstance of the people attaching less value to female children, and therefore being more ready to produce them for vaccination.

Madras. The arrangements for vaccination in the Madras Presidency are now entirely under the control of the Local Fund Boards and the municipal authorities; the professional supervision of the vaccinators is, however, conducted by the Inspector and his assistants, who work under the direction of the Sanitary Commissioner.

There do not appear to be serious obstacles to vaccination in this Presidency; but there is a prejudice against infants being operated on too young. Of a total of 483,192 operations, only 52,505 were performed on children under one year of age.

There appears to be great room for improved efficiency in the system. The introduction of compulsory vaccination is generally urged as the remedy called for.

Bombay. The employment of the Bombay vaccination officers in general sanitary work led to no falling off in the discharge of their proper functions, but the reverse. The total number of operations was 815,177, against 808,353 in 1875–6. Of this number, 732,184 were primary; and the ratio of success per cent. of persons (not operations) was 95·35. Energetic measures were taken to suppress inoculation, which was practised in some parts of the Presidency.

Punjab. The Punjab report on vaccination has, through a misunderstanding, been rendered for the calendar year 1876. It may, however, be mentioned that during that period the number of persons vaccinated by the provincial establishment was 285,068, the number of operations by men employed by Native States was 4,194, and the grand total under all agencies was 405,950. As far as the figures can be compared with those of the preceding report, they indicate a considerable falling off; no explanation is offered of this unsatisfactory circumstance.

It is very rarely that any municipal committees are willing to give assistance; they are lavish in their promises, but do nothing, and the members sometimes purposely absent themselves. An exception to this rule was found in the municipal committee of Nakodar, in the Jullundur district, who gave ready help to the vaccinators, with the result that the people came forward in numbers at once.

The Deputy Commissioner of Loodiana observes:—"In the municipal towns of "Loodiana and Jagraon the medical authorities have rendered great assistance in the cause "of vaccination. In Loodiana the municipality has defrayed any necessary extra charge. "The assistance rendered by respectable natives is, I am sorry to say, not very great, and it "is only the Mahomedan element in the population which is at all alive to the benefits of "vaccination. * * * I fear we shall never successfully grapple with "small-pox in this country unless we have legislation authorizing compulsory vaccination, "or, at any rate, Government must not shrink from backing up its officers in encouraging it "at least; whereas at present a district officer has a very difficult and delicate part to act, "being held responsible for the easily excited prejudices of an ignorant and superstitious "people, and at the same time not entitled to credit unless vaccination has had the good "fortune to spread."

At Umballa the Hindoo community were as much opposed as ever, and the results were very unsatisfactory. The Local Government, however, "cannot but think that the arrangements

* Not 988,858, as stated in Vol. IX., p. 18.

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" must be bad; there seems no reason why the objections to vaccination should not be overcome " there as elsewhere by proper management. How much may be done, where attention is " really given to the matter, is shown by the good results reported at Loodiana, where the " interest taken by the hospital assistant in the cause of vaccination is stated to have almost " freed the town from small-pox, while all around the disease is terribly prevalent."

At Delhi also prejudice was still very strong. On the other hand, in Mooltan city the state of things continued to be most satisfactory. At Muzuffergurh opposition was gradually decreasing; several native gentlemen gave good assistance; and it was believed that very few unvaccinated children remained. The extreme apathy of the people at Rajanpur was said to be somewhat giving way; in some few instances they appeared anxious to have their children operated on.

An epidemic of small-pox in the Hangur valley of the Kohat district, from which some 300 children were said to have died, seems to have opened the eyes of the influential men of those parts of the district to the possible advantages of vaccination, which they had hitherto ignored. The Khan had the children of his family and of his relations vaccinated, and many of the people followed his example. Altogether over 360 children were operated on, whereas in former years the number had never reached 50.

The progress in Native States was on the whole very satisfactory. Work was carried on successfully in Mandi, at the request of the Rajah, who has always encouraged vaccination.

A great number of people were attacked with small-pox in Simla during the year. The patients admitted into the hospital came from widely different parts. The following remarks by the Superintendent General tend to demonstrate the beneficial effects of vaccination:— " In the Simla Hill States there were comparatively many cases, spread over the whole of " the States from Kanawar, in Bisahir, close under the snowy range, to those bordering " the plains. As well as I could learn, only adults were attacked, and these had nearly all " been inoculated when they were children. In only a very few instances were there more " than two or three cases in any one village. It appeared as though small-pox was in the air, " seeking for convenient localities for appearing in force. Notwithstanding its wide- " spread nature, it did not find such localities; and this, I believe, can only be attributed to " the careful manner in which the infant population had of late years been protected by " vaccination. Had this not been the case, there would have been a great outbreak of the " disease, accompanied by a large mortality, such as used to happen in former days when " vaccination was unknown to the people. Several Rajahs and Ranas sent urgent requests " for vaccinators. Men and women, who had been either innoculated or vaccinated, begged " to be again operated on. At the special requests of the Ranas of Dhami and Koti, they " themselves were revaccinated, and their Ranees and all their households were either " vaccinated or revaccinated, and operations were performed throughout their States."

The Kuppoorthulla State had been visited by the Superintendent General about three years previously; inoculation, which was formerly much practised, has quite ceased since that visit.

The Maharajah of Cashmere had, as a tentative measure, allowed vaccinations to be performed in the parts of his State adjoining the Hazara and Murree hills. Work was done here in so satisfactory a manner, the people showing so little objection to it, that permission was requested and granted for its extension to other places. Everywhere were found extensive traces of small-pox, both recent and old. In one village, in which there were only 50 houses, were found 55 children under six years of age with recent marks of the disease in various degrees of severity. On this occasion there were vaccinated in Cashmere 11,817 people, 98·0 per cent. of which operations were successfully done.

North-West Provinces.

Both in the number of operations and in the percentage of success a continued improvement appeared in the North-West Provinces. The former amounted to 624,769; and the latter (in primary cases) to 92·03. On the latter point the Superintendent General remarks that he questions much better results ever being obtained, considering the carelessness of native parents in protecting the arms of their children against injury of the vesicles.

Of the operations 35,083 were secondary; almost the whole of these were performed in the Kumaon division, for it is there only (excepting Dehra Doon) that the birth-rate has been more than overtaken, and consequently consideration can be given to revaccination. The high character this division had previously borne for both the quantity and the quality of its work was fully maintained during the year.

The relative increase of the number vaccinated under one year of age was satisfactory.

The number of females vaccinated always exceeded that of males. The Superintendent General says that two causes may account for this preponderance of females,—one, the hope that vaccination may kill them; the other, that it may save their faces from pitting, and render them more attractive in the matrimonial market.

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It is clearly shown that there are no class or religious prejudices in the North-West Provinces in the matter of vaccination.

Contrary to the experience in the Bombay Presidency, the greatest activity of small-pox in these provinces is during the hot months of the year. Unfortunately the vaccine virus is found not to take in the hot weather, and operations have therefore to be restricted to the cooler months.

Central Provinces. Vaccinations performed by the Government establishments in the Central Provinces numbered 265,992, being an advance of 25·16 per cent. on the previous year. Adding dispensary vaccinations, there were altogether 255,408 primary operations, of which 95 per cent. were reported as successful. Complaints were general of indolence and carelessness on the part of vaccinators, including native superintendents; while hospital assistants falsely imagined that this did not form any part of their legitimate duties.

The hospital assistants under the control of the Civil Surgeon of Jubbulpore carry out efficiently the work of vaccination in both the sudder town and the towns in the interior. The Chief Commissioner of the province wishes that this example were followed in other districts.

Berar. The report of vaccination operations in Berar is very satisfactory; but, being made up for the calendar instead of the official year, it cannot well be compared with those preceding it. In 1876 there were 63,429 successful cases, against 42,781 in 1875. It would appear that 74 per cent. of persons born in the province are vaccinated.

Rajpootana. Vaccination progressed steadily in Rajpootana, and particularly in the Dholepore State. In the large cities the people are less hostile to it than they were some years ago, but there is still considerable prejudice among the more ignorant. It is not expected that much progress will take place in Ajmere until vaccination is made compulsory.

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VI.—MEDICAL INSTITUTIONS.

Civil Hospitals and Dispensaries.

The hospitals and dispensaries of Bengal were increased during 1876 by 23, and numbered 230 at the close of that year. The numbers of indoor and outdoor patients treated were 23,012 and 809,275; or including the Calcutta institutions and endemic fever dispensaries, the grand total amounted to 1,252,793. Bengal

The proportion of operations successfully performed was a very favourable one; the results in the country are found to be generally better than in large cities, because the conditions under which patients are placed in the former tend much better to recovery than in the latter.

The following were the percentages of the total income obtained from different sources :—

	1875.	1876.
Government	32·60	32·50
Local Funds	27·82	22·91
Interest on Capital	4·64	5·86
European subscriptions	6·74	6·66
Native subscriptions	28·19	32·06

To the Government subscriptions must be added the cost of medicines, books, &c., which for the provincial hospitals and dispensaries amounted to upwards of 6,000*l.* a year. There were 25 self-supporting institutions. Municipalities are reported to take an increasing interest in the support and proper working of dispensaries.

The usual statistics are given below of the Calcutta medical institutions :—

Calcutta Medical Institutions.	1875.				1876.			
	Persons treated.			Died per 1,000 of treated.	Persons treated.			Died per 1,000 of treated.
	In-door.	Out-door.	Total.		In-door.	Out-door.	Total.	
1. Medical College Hospital	4,456	45,374	49,830	134·20	4,352	44,679	49,031	136·19
2. General Hospital	3,234	9,544	12,778	65·24	3,999	16,293	20,292	55·01
3. Mayo Hospital and Dispensaries	2,006	191,759	193,765	117·14	2,029	187,661	189,690	127·15
4. Campbell Hospital	7,782	—	7,782	280·77	6,640	—	6,640	250·45
5. Municipal Police Hospital	2,880	—	2,880	22·56	2,261	—	2,261	22·99
Total Calcutta Hospitals	20,358	246,677	267,035	—	19,281	248,633	267,914	172·08
6. North Suburban Hospital	625	—	625	217·60	635	—	635	231·49
7. Sumbhoo Nath Pundit Dispensary	—	9,907	9,907	—	—	6,475	6,475	—
8. Alipore Dispensary	119	5,968	6,087	319·32	110	4,495	4,605	136·36
9. Aratoon Apcar Dispensary	—	9,539	9,539	—	—	9,559	9,559	—
10. Howrah General Hospital	2,245	18,024	20,269	154·56	2,340	18,488	20,828	150·00
Total Suburban Hospitals	2,989	43,438	46,427	—	3,085	39,017	42,102	166·28
Grand Total	23,347	290,115	313,462	—	22,366	287,650	310,016	147·76

If the moribund cases be deducted, the death-rates at the following institutions would be reduced as shown below :—

Medical College Hospital	103·56
General Hospital	46·67
Mayo Hospital, &c.	113·61
Campbell Hospital	224·16
North Suburban Hospital	190·91
Alipore Dispensary	59·40
Howrah Hospital	124·55

Of the total number treated, no fewer than 307,230 were new cases.

The decrease in the number of in-door patients was mainly due to the excellent health enjoyed by the police force, and to fewer admissions into the Campbell or Pauper Hospital.

There was also a falling off in the aggregate of out-door patients; but the increasing popularity of the out-door department of the General Hospital led to a considerable increase in the attendance there.

Although the total attendance was less than that of 1875, still it was so much greater than that of any other preceding year as to show, in the opinion of the Government, that the popularity of the institutions remained unimpaired.

The proportion of males to the total treated was 60·38, of females 15·83, and of children 23·78 per cent. These percentages agree very closely with those of the four preceding years.

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The statistics of fatality from the principal diseases are much less favourable to Natives than to Europeans, probably owing to the inferior physique of the former.

The general repairs of the hospital buildings seem to have been well attended to during the year. In some hospitals certain important sanitary improvements were made inside the buildings, as well as in the grounds surrounding them.

Of 40 deaths following operation in the Medical College Hospital two only could be assigned to "hospitalism," indicating an improved sanitary condition of the wards even before the commencement of the intended enlargement of the institution.

Madras. The year 1876–7 commenced in the Madras Presidency with 134 hospitals and dispensaries, and before its close 21 were added to the number. Indoor patients increased from 28,968 to 38,751, and outdoor from 725,380 to 781,844. There was a satisfactory advance in both European and Native subscriptions. "As a rule," it is reported, "medical officers and sub-"ordinates in charge of hospitals and dispensaries carried on their duties with zeal and "efficiency during a year in which all the resources of the department were severely strained."

Bombay. The statistics of the working of civil hospitals in the Bombay Presidency are drawn up for the official, and those of dispensaries for the calendar year; the arrangement is an inconvenient one, and the reasons for it are not clear.

In the former the total number of in-door patients treated during 1876–7 was 27,008, and of out-door 237,760; the fresh admissions within the year being 25,662 and 233,874 respectively. Excluding from the comparison the Bhuj hospital, which in the preceding year was classed as a dispensary, a falling-off appeared in the numbers treated to the extent of 157 and 4,131 in-door and out-door patents; this is attributed to improvement in the general health of the population. In Sind, where no such improvement occurred, there was an increased number of admissions.

At the close of 1875–6 there were 122 dispensaries in operation (besides several in Native States over which no direct control is exercised by Government). The number was increased by the end of 1876 to 129, the Bhuj dispensary being transferred to the list of civil hospitals. Not taking this latter into account, the statistics for the year 1876 of total treated showed an improvement, as compared with those of the year 1875–6, of 590 in-patients and 36,478 out-patients. The total numbers for 1876 were 5,876 and 578,667.

With regard to the hospitals, the Surgeon General (Dr. W. G. Hunter) bears testimony to the zealous and efficient manner in which the various medical officers, including those of the subordinate rank, performed the duties entrusted to them; and he adds that the reports contain abundant evidence that a large and increasing amount of excellent professional and sanitary work is being accomplished at these institutions. And on the subject of the dispensaries he makes the following remarks:—"I am of opinion that, "with very few exceptions, the objects for which they were established are efficiently "carried out. In the dispensaries of the Northern Konkan and of Guzerat this is "especially the case: there the people are more civilized and more intelligent, and "are quick to appreciate the benefits conferred by European medicine. In Sind, too, "European medicine and surgery appear to be held in great esteem by the people. As "regards most of the Deccan dispensaries the same observation holds good; but in this "part of the Presidency there are also some dispensaries which are situated in localities "where the majority of the inhabitants belong to the more ignorant classes, and it is "amongst these that the chief opposition, or indifference it may be, to scientific medicine is "encountered. When an epidemic occurs, instead of availing themselves of the skilled aid "and advice placed within their reach, they prefer, by way of averting the outbreak of "disease, to resort to the propitiation of evil spirits. Even close to Bombay such pro-"ceedings are not uncommon. The only way to bring home to such people, wherever they "exist, the advantages of Western medical science is to afford them opportunities of *seeing* "the benefits that result from it, and for this purpose we possess no more effectual weapon "than surgery. Nothing so fully establishes the reputation of a dispensary or creates such "confidence as successful surgery: the history of even a single successful case is spread "far and wide, with the result generally of attracting more patients to the dispensary."

Of the total treated for all diseases at dispensaries the percentage treated for malarious fevers was 20·7. An increased prevalence of these affections in Sind followed on the annual inundations, which were more extensive than usual.

The returns point to a general and increasing prevalence of syphilis, and they are stated to give but a very faint idea of the extent to which the population is tainted.

The variations in the prevalence of calculous diseases in different localities would seem to render this Presidency a valuable field for the investigation of such maladies. They are commonest in Sind, and of frequent occurrence in Kutch, Kattywar, &c., while in South Guzerat, the Konkan, the Southern Mahratta county, and other parts, they appear but seldom.

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Six entirely new dispensaries were established in the Punjab, and seven institutions, formerly maintained from a special fund which has ceased to exist, were brought on the regular provincial returns, making a total number of 163. Notwithstanding this addition to the number, the State contribution was relieved by a transfer of charge, amounting to about 2,500*l.*, from provincial to municipal and district funds. There was, however, a falling off in the subscriptions of both Europeans and Natives. The liberality of Lala Mehr Chand was continued, while Bunsi Lal and Ram Ruttun, bankers of Meean Meer, also rendered valuable help. **Punjab.**

The fresh admissions during the year numbered 1,205,462 against 1,032,073 in 1875. The in-door patients increased from 28,615 to 30,428.

Besides the European hospital, there were 156 dispensaries in operation in the North-West Provinces at the close of 1876. The in-door and out-door patients numbered 24,670 and 808,438 respectively, showing satisfactory increases of 1,502 and 45,887. The proportion of the charges borne by Government was much higher than it should be, amounting to 16,658*l.*, as compared with 13,504*l.* from local receipts. **North-West Provinces.**

No new dispensaries were opened in Oude during 1876. While there was a slight decrease in the number of persons treated, a considerable increase in the number relieved and cured appears to indicate that the treatment was more successful. **Oude.**

The increase of attendance at the dispensaries of the Central Provinces continues steady year after year. In 1875, although indoor patients were somewhat fewer than in the previous year, the number of out-patients largely increased. The Chief Commissioner does not believe that greater resort than usual is made to dispensaries in seasons of epidemics, but—which he considers a more hopeful sign—the institutions are found to be more and more appreciated by the people as places where benefit and relief may be obtained in regard to the yearly recurring fevers and other ailments which are the real scourges of the country. **Central Provinces.**

The 24 dispensaries in Berar have all been established since 1867, and are on the whole doing good work. **Berar.**

The total number of beds was 59, the same as in the preceding year, but the number of patients fell from 1,215 to 882. In the Akola district, where 28 beds were provided, the daily average number of patients was only 5·69. This falling off was due to restrictions that had been placed on the class of cases to be admitted; but the Commissioner of the Assigned Districts observes that, as it cannot be doubted that there are numbers of poor sick persons who would be in every way suitable indoor patients, it is a little strange that they do not avail themselves of the shelter and attendance offered them more freely.

The out-patients numbered 89,897, as compared with 76,103, being an increase of 18·1 per cent.

The Resident comments on the discreditable apathy shown in this province with regard to the support of dispensaries. The whole of the subscriptions raised from the native public during the year amounted to 119*l.*

The number of outdoor patients in British Burma rose from 58,750 to 63,758. This was the more satisfactory as the number of dispensaries remained the same as in the previous year. The Burmese are stated to be rapidly acquiring a strong belief in the surgical skill of British medical officers; in regard to medical treatment there is more reluctance, but every year sees a fair advance made in this direction also. **British Burma.**

Lock Hospitals.

In consequence of remarks by the Army Sanitary Commission (*see* Vol. VIII., pp. 133 and 192), the general subject of the working of the lock hospital system has undergone investigation in India; and the result is summed up by the Government of India in the following words:— **Working of lock hospital system.**

"From the reports submitted it appears that the working of the lock hospitals has, upon "the whole, been productive of good, both in diminishing the prevalence and mitigating the "severity of venereal disease among registered prostitutes and the European soldiery, and "that the amount of good thus effected is sufficient to warrant the maintenance of the "system with such improvements as may be found practicable.

"The circumstances which have chiefly interfered with the successful working of the rules "for the prevention of venereal disease, and have rendered the results incomplete and "unsatisfactory, appear to have been the difficulty of suppressing clandestine prostitution "and the low state of morality prevailing among women in European regiments.

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"With regard to the removal of the former of these difficulties—the difficulty of checking "clandestine prostitution—local circumstances, as many of the reports show, make this more "easy in some places than in others, but much doubtless depends upon regimental arrange- "ments, as is proved by the marked difference exhibited in some cases by various bodies of "men at the same station. The prevalence of disease indeed may be said to depend more "upon regimental control than on the working of lock hospitals, and while the latter may "doubtless be made more effective than at present is the case, the Government of India are "persuaded that much must depend on the improved efficiency of the former. In one case "which has been brought under the notice of the Governor General in Council it was "conclusively shown that the prejudices entertained by the commanding officer of a regiment "against the system nullified all protective measures, or rather virtually caused their "abandonment.

"As regards the protection of the general population, a great deal more can be effected "under the Contagious Diseases Act (XIV. of 1868) than is or can be done under the "cantonment rules which are restricted to limited areas. In cantonments no law can be "made to apply to European married women, in order to prevent the mischief caused by "them. But as regards the Contagious Diseases Act there seems every reason to believe that "if, in co-operation with the military authorities, measures are taken to bring a wider range "of the population under the precautionary measures prescribed therein, and if these measures "are organized in such a way as to avoid oppression, and without involving inordinate "expenditure, much good may be expected to result, although at the same time it would "seem advisable to work more directly upon the troops themselves for whose benefit the "whole scheme is established.

"The following measures for the prevention of illicit prostitution and the more efficient "working of the system generally appear to the Government of India to be worthy of "consideration :—

"(a.) The limitation of the area within which preventive measures shall be enforced, and "the employment of a special detective police under the superintendence of a "European, selected British soldiers being possibly employed in this capacity. It "will of course be understood that the effect of any measures of this kind must "depend upon the ability of the military authorities to prevent all but men of good "character from going beyond the protected limits, which again must depend to "a considerable extent upon local circumstances.

"(b.) Increased penalties to be imposed on women, whether in cantonments or in adjoining "towns and villages, found practising illicit prostitution.

"(c.) The more hearty co-operation of the civil and military authorities in preventive and "curative measures."

Much difference of opinion exists as to whether the lock hospital system has done good and is worth maintaining. The Army Sanitary Commission and the Sanitary Commissioner with the Government of India have latterly given expression to very great discouragement; but this feeling does not appear to be shared by the Principal Medical Officer, British Forces, who has recorded the following important remarks :—

"That these (benefits) have been considerable I have not a moment's hesitation in "affirming, not only in reducing the amount of venereal disease in the army, but especially "in modifying the degree of its virulence amongst our troops. * * *

"For the five years (1859 to 1863) previous to the introduction of the lock hospital "system, an average of 304 venereal cases per 1,000 of strength were admitted into British "hospitals in Bengal annually; or, in other words, almost one-third of the force passed through "hospital. As each venereal case (taking the average of the past 10 years as a standard) stays "24 days in hospital, this represented a constant inefficiency of about 20 men out of every "1,000, or over 800 men in the Bengal Presidency.

"For the 10 years (1867 to 1876) succeeding the final introduction of the Act, the average "annual venereal admission-rate per 1,000 has been 186, which represents a constant ineffi- "ciency of over 12 out of every 1,000 British soldiers in Bengal, or about 450 men always "away from duty. * * *

"Prior to 1859 the statistics are not sufficiently reliable to afford us quite safe data for "judgment, but the Sanitary Commissioner in his report remarks: 'On reference to the "'statistics of former years it will be seen that the proportion of venereal disease in those "'days, without lock hospitals, was much less than it has ever been since. During the first "'five years (1852–53 to 1856–57) the annual average admission-rate was only 168 per "'1,000.'

"Such a statement, if it leaves unconsidered the special conditions of the army at the time, "may well justify the conclusion of the Army Sanitary Commission 'that the amount of "'venereal disease in the Indian army is irrespective of lock hospitals, and depends on other

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" 'yet undiscovered points about the disease.' But if these are impartially examined, ample " explanation is afforded as to the diminished disease which then prevailed.

" In the first place, the duration of service was unlimited, and the ranks were mostly filled " by men more or less advanced in life, and who, on other accounts beside, were less likely " to contract disease than are the recruits with which an altered system now fills our " regiments. * * *

" A yet stronger reason is to be found in the condition of life of the soldier. The married " establishment of regiments was then seldom under its full nominal strength of 120 women " per 1,000 men. " * * * There was a degree of permanency in Indian service which " led to the very general formation of alliances between the soldiers and native women, " partaking much of the nature of marriage without leave. * * * " Further, although " there were no lock hospitals, the regimental 'Lall Bazaar' was an institution sanctioned " by the universal custom of the service. Each regiment had its quota of prostitutes, whose " comfort and wellbeing were carefully attended to, and who were periodically inspected, " and in cases of sickness treated by the subordinate medical establishment. * * *

" Although, as a general rule, the degree of exemption is in direct proportion to the " vigilance of the civil authorities in enforcing protective rules, combined with the care and " energy exercised by the medical officers taking part in their administration, signal instances " do exist where, in spite of these apparent precautions, disease continues rife."

The fact is that the statistics of admissions fluctuate so strangely from year to year that they form no ground for saying either that there has been improvement or that there has been none; and this has led some medical authorities to conclude that, irrespective of personal infection, there are seasonal agencies at work, as in the case of cholera and other zymotic diseases.

At some stations a strict enforcement of the rules appears to have been followed distinctly by a diminution of disease.

Any comparison of the statistics of stations provided with lock hospitals and those unprovided is invalidated by the circumstance that the latter are always stations at which the force is relatively small.

The following are remarks by the Surgeon General at Madras:—

" Prostitution is a recognized and not always a despised trade; it is a form of religious " consecration, and, in the shape of concubinage, is a common feature of native life. " Prostitutes in India are not the social outcasts they are in England. These and other " points must be weighed before the experience of India can be compared with that of " England. In this Presidency, at least, and as far as the health of the European soldier is " concerned, Contagious Diseases Acts and lock hospitals are absolutely necessary. If they " fail at any station, the failure is due to preventable causes alone. The *laissez-faire* policy " will not do in India, and the repressive policy is impossible; there remains, therefore, but " the policy of recognition and of forcible registration for our adoption, and that policy, if " honestly and vigorously carried out, will certainly succeed, though not to the extent of " stamping out syphilis."

As stated by the Government of India, the energetic co-operation of the military authorities seems to be absolutely essential to success. In a recent report the magistrate of Saugor pointed out that the power of the civil police to prevent unlicensed prostitution is greatly limited by their fear of the European soldiers, with whom they run no little risk of collision when attempting to arrest women illegally plying their trade; and much must therefore be left to the regimental police. The Army Sanitary Commission object to the employment of British soldiers on such duties.

The Commander-in-Chief in India has issued a circular to the following effect:—" Sir " Frederick Haines is averse to enforcing in India the hospital stoppages made from men " elsewhere on account of venereal diseases, but to enable His Excellency to abstain from " inflicting this penalty on the soldier in India, General and Commanding Officers must " exercise increased exertion, in concert with the civil authorities, for carrying out the " regulations."

While stricter police supervision is undoubtedly the direct remedy required, a more radical, though more general, one lies in the direction of raising the tone and character of the soldier, and providing him with healthful pursuits and recreations; and much has been done in this direction by the Government of India and by successive Commanders-in-Chief.

Bengal.

The result of the Lieutenant Governor's strong comments (*see* Vol. IX., p. 24) on the administration of the Dinapore lock hospital led to very close and energetic attention being paid to the subject in 1876 by the local authorities. The movements of troops from the several cantonments in connection with the Prince of Wales's visit were the occasion for the contraction of a large amount of disease during the first quarter of the year, but after that

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the number of cases at Dinapore steadily diminished, owing to the increased supervision of the authorities, and to the special measures adopted during the year, the most important of which were the strengthening of the establishment, increased police supervision, the more complete segregation of the women, and, finally, their more frequent examination. The number of men suffering from disease in each quarter was always in inverse proportion to the number of prostitutes sent to the hospital.

At Barrackpore the working of the rules appears to have been very lax. The number of women reported for non-attendance, with an average registered population of only 56, was 143, of whom apparently none were punished or fined. No less than 53 per cent. of the admissions among the troops were debited to the first quarter, for the reason above stated.

The rules were more carefully enforced at Dum Dum; while at Hazareebagh the working of the system is stated to have received a praiseworthy amount of attention from the local officers, and to have been marked by discretion and success. The returns for Darjeeling did not furnish sufficient information to render a review possible.

The results of the Calcutta census shows conclusively, in Dr. Payne's opinion, that a very large number, probably a majority, of the prostitutes in that city remain untouched by the law.

As far as can be ascertained, there would appear to have been a trifling decrease in the amount of venereal disease among the women of Calcutta during 1876. The state of the European garrison of Fort William was less satisfactory than in any year since 1872. This was due (as had been the case in 1872) to the importation of disease by a newly-arrived regiment which was not inspected on arrival. During the year 12·6 per cent. of the garrison were affected with venereal diseases of various kinds, and 2·7 per cent. suffered from primary syphilis. It speaks well for the sanitary arrangements and cleanliness of the lock hospital that, while cholera was very prevalent all around, there was only one case amongst the women in it.

Madras and British Burma.

The admissions among troops in the Madras command from all venereal complaints from 1871 to 1876 was, per 1,000 of strength, as follows:—

1871	173·75
1872	164·27
1873	149·81
1874	185·73
1875 (Tonghoo included)	193·22
1876	179·27

This table shows curious fluctuations, and appears to point to the occurrence in the case of syphilis, as in that of some other diseases, of periods of increased and diminished intensity.

The Principal Medical Officer, British Forces, remarks that, to judge of the beneficial results or otherwise of lock hospitals, the most reliable method is to take into account only primary syphilis and gonorrhœa. If this plan be adopted, a general improvement appears in 1876, as compared with the previous year. Seven stations at which lock hospitals existed showed a decrease of disease; at three it was quite or almost stationary; and at three others there was an increase, which was attributed in each case to clandestine prostitution. Among stations unprovided with lock hospitals, Poonamallee is, with reference to strength, the only one worthy of being noted; and here also there was improvement. This station had the services of a special constable.

The statistics show that 1,418 patients were admitted during 1876 to the nine military lock hospitals, that the average daily sick amounted to 99·12, and that the average stay in hospital was 24·18 days; all these aggregates being less than those of 1875, the two latter the lowest recorded since 1870. The returns from the four civil lock hospitals are defective. In the former class of hospitals the ratio of cases of primary syphilis per 1,000 of total admissions was 275·74; in the latter it was 353·92. The former ratio was higher than that of 1875, but lower than any other from 1871 inclusive; while the latter was less than the ratios of the preceding three years.

At Bangalore the specific disease was less prevalent, its type was milder, and the diminution in the aggregate of syphilitic cases was not attended, as frequently happens, with increase in the aggregate of gonorrhœal cases. A corresponding report in connection with the health of the European troops stationed at Bangalore shows a marked diminution in cases of primary and of secondary syphilis as well as of gonorrhœa. It is not, however, clear whether this improvement had any relation to better administration of the Act. The attendance of registered women at the periodical inspections was more satisfactory, being about 50 per cent. of the whole number, as against 33 per cent. in 1875. Twenty-five unregistered prostitutes applied for treatment during the year, being 16 in excess of the corresponding number for the preceding year.

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The returns from Bellary show less favourable results than those from Bangalore. While at the latter the ratios of admissions among the troops per 1,000 of strength were, for primary syphilis 24·37, for secondary 14·62, and for gonorrhœa 53·62, they were at the former 157·01, 17·81, and 83·51, respectively. Syphilis at this station was reported as being of a mild type, and amenable to treatment. Severe cases of disease, when they occurred, were observed almost invariably in the persons of non-registered women from the district.

The results at Secunderabad, too, compare unfavourably with those at Bangalore. Primary syphilis constituted 372·70 per 1,000 of the admissions; secondary syphilis was to primary as 1 to 2·44, showing the prevalence of constitutional infection at this station. As the registration practically extends to all classes, it is inferred that clandestine prostitution is common, and that the clandestine prostitutes are largely diseased.

At Kamptee there was a diminution in the number of primary syphilitic cases, with a more marked diminution in the number of cases of secondary syphilis. These results were accompanied with an increase in the amount of gonorrhœa. The registration here is far from satisfactory, although the police have instructions to apprehend all unregistered prostitutes, and there is also a system of regimental police, under the superintendence of a Provost Sergeant, for each corps, whose duty it is to "prevent women of loose character from gaining "admission into or even from coming near the barracks." Clandestine prostitution is prevalent, and its detection seems to be difficult. The men have no difficulty, apparently, in pointing out the registered women who, they suppose, have diseased them, but they are neither so ready, nor so successful, in pointing out the unregistered.

The registration at Rangoon is reported as incomplete, the machinery for enforcing it being insufficient. It appears, moreover, that convictions of unregistered prostitutes are with difficulty effected, and that it has become an easy thing to evade the provisions of the Act, owing to the impossibility of obtaining legal proof that a woman is a prostitute.

Acting on a suggestion of the Madras Government (*see* Vol. IX., p. 26), the Commander-in-Chief obtained reports from the several officers commanding corps in that Presidency as to the supposed intercourse which takes place between soldiers and the female hangers-on of barracks and their neighbourhood. The general tenor of these reports is to the effect that all that can be done is done by the regimental police, and that the hangers-on are not the main source of the mischief, but a class of women over whom the civil police alone are in a position to exercise control.

On the other hand, the Chief Commissioner of British Burma writes, with regard to disease in that province: "It is probable that the greater part of this specific sickness among troops "is contracted from the women of their own camp-followers and attendants, who reside in "convenient vicinity, and who would be less difficult and expensive than strangers. Unless "these are subjected to rigorous surveillance, every effort on the part of the civil authorities "must be more or less abortive."

In the same report the Chief Commissioner states that in every station, except Prome, the type of disease during 1876 was represented as of a milder character than in the previous year, and also to have decreased in amount, though there was a larger number of women registered, while in the returns of jails and general dispensaries a considerable increase of venereal cases appeared; and he observes: "A diminution of venereal disorder among "registered women, happening concurrently with additional disease elsewhere, sufficiently "proves what little effect can be exercised over the general population by the present partial "and accidental system of supervision. The Chief Commissioner is still of opinion, however, "that the results of the Act would be less meagre and contracted were a little more vigour "displayed by the police in the detection, and by the magistrate in the punishment, of "delinquency. * * * * The difficulties of detecting clandestine prostitution seem to "increase rather than diminish every year. The women are rich enough to bribe, and the "subordinate police are not unwilling to receive bribes; while, on the part of the men, there "is no assistance in securing convictions from their disinclination to disclose the women "from whom disease was contracted. Such as it is, however, the system has done good, "and it is capable of other results if magistrates are prompt in punishing where punishment "is due."

Bombay.

Information from Bombay regarding the working of the lock hospital system is very scanty and inaccurate. It may, however, be mentioned that the hospitals in that Presidency, twelve in number, were established before the end of 1869, with the exception of one which was started in 1870, and that, comparing the seven years prior to 1869 with the seven years 1869–75, the average admission-rate from all venereal diseases during the first period was rather over 23 per cent. of strength against an average of 16·5 for the latter period.

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Lunatic Asylums.

Bengal. The progressive annual increase of the asylum population of Bengal was referred to in the last Report (p. 26). In 1876 the figure (1,513) was the highest registered in any year. This tendency to increase received, however, a check through the laying down by Government of the principle that persons suffering from the temporary results of sickness, intemperance, or debauchery, and those whom their friends ought to support, should be excluded from asylums, and that, in addition to criminal lunatics, those only should be received who are absolutely dangerous, or who, having no friends or resources, may be in the acute stage in which there is most hope of recovery from medical treatment. The immediate result of this rule was that, whereas the population on 1st January 1876 stood at 1,147, the number in confinement on the last day of the year was 1,131; while several releases have since taken place, and others were in contemplation. The total number of admissions was 329, and of re-admissions 26, against 384 and 34 in the previous year.

Of the re-admissions, 13 were cases of recurrent insanity chiefly due to intoxication. Ganja was accountable for 30·66 per cent. of the total cases treated.

The proportion of recoveries was lower than in any previous year; this is doubtless in some degree attributable to the more careful selection of patients for admission. The death-rate was unprecedently low, showing, in the opinion of the Surgeon General, that all matters relating to the health of the lunatics have been better understood and better attended to of late years.

The superintendence of the asylums was generally well reported on. With regard to that at Dullunda, the Deputy Surgeon General makes the following remarks:—"As an official "visitor, the undersigned has had ample opportunities of observing the management "of the institution, and can bear testimony to its excellence in every detail. The inmates "are kindly and judiciously treated; diet, sufficient in quantity and variety, of good quality "and well cooked; clothing sufficient and suited to the season; and conservancy very "carefully attended to." In the case of Hazareebagh the Lieutenant Governor records that he "has read with interest the description given of the internal arrangements of "the asylum, and he considers that Dr. Birch is entitled to much credit for all that he has "done, with a practically untrained staff, to alleviate the sufferings of the patients confided "to his charge."

Madras. The asylum population in the Madras Presidency likewise shows a steady increase year by year. During 1876–7 there were 172 persons admitted, of whom 126 were males. The better classes of natives, whether Mahomedans or Hindus, have strong religious and caste objections against placing the females of their families under treatment in a lunatic asylum.

The percentage of recoveries to admissions in the three institutions taken together was 32·55, against 51·97 in the preceding year; and the percentage of deaths to daily average strength was 19·90 against 11·27. The latter unfavourable result is accounted for by the exceptional circumstances of the season in the Presidency generally.

The report of the working of the Madras Asylum is especially satisfactory. The Superintendent "takes deep interest in the various schemes for providing occupation and for "securing the recreation of the inmates of the asylum. These truly curative agencies act "beneficially on the disordered minds of the unfortunate patients, by diverting their attention "from their own morbid feelings to useful and easily-acquired mechanical employments, and "by diffusing cheerful influences over the daily life of the asylum, which life, without such "influences, would be dull, dispiriting, and monotonous. The principal occupations are "weaving, needle-work, rattan-work, rope-making, gardening, cleaning the grounds, drawing "water, cooking, cleaning rice, pounding curry-stuff, and sifting dry earth for conservancy "purposes. Among the recreations of the inmates may be mentioned morning walks in the "grounds, the use of a fair library, the presence of a regimental band once a fortnight, and "an annual Christmas entertainment with dinner, fire-works, &c."

Punjab. At the commencement of 1876 there were 80 lunatics remaining in the Delhi Asylum; 30 were admitted during the year, a smaller number than in any year since 1870. The number discharged cured was four times that of the previous year. The percentage of deaths to average strength was 13·88, exactly the average rate for the nine preceding years.

The following incident is given in the report of the Superintendent:—

"Ashraff Khan, the criminal lunatic, who was reported last year as having attacked and "severely injured the jemadar, and having been locked up ever since for security, has been "gradually restored to his liberty, and now he goes about free and unrestrained among the "other lunatics. He has even within the last few weeks been made to consider himself a

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" kind of assistant-keeper, and has helped to keep order among the lunatics. He is a man, " however, who requires constant watching. On one occasion, in the hot weather, he refused " to leave his sleeping ward until he had seen me, and I found the reason was that he " thought he had been cheated of his proper quantity of food by the jemadar, whom he still " looks upon as his enemy, and who he believes wishes to kill him. He first asked me the " weight of the bread and dâl which he ought to get, and on being told this he brought out " the whole of his previous day's rations, which he had hidden away in a corner untouched, " and requested that it might be weighed there and then. Fortunately both the bread " and the dâl, although they had been kept so long, were rather over the prescribed weight. " He was a little crestfallen at the result, but apparently satisfied, and I have heard no more " complaints since."

Also the following:—

" One of the epileptics has an interesting history. She is a girl of about eight years of age, " and is said to have been found in the jungle by a man when ploughing his fields, and was " believed by him to be a 'wolf-child.' When brought to the asylum she was extremely " timid, and tried to hide herself in corners; she could not speak, but only uttered a peculiar " kind of whine. When any one went near her or spoke to her she seemed afraid of being " struck, and held up her hands to defend herself. There were some scars on her arms. " When food was given to her, she always smelt it before putting it to her mouth. Great " pains were taken with the child to try and draw out any latent intelligence that might be in " her, but repeated severe attacks of epilepsy have reduced her to even a lower state of idiotcy " than she was in before."

Of the causes ascribed for insanity 60 were of a physical and 24 of a moral nature; among the former indulgence in intoxicating drugs or liquors accounted for 36 cases.

After encountering every kind of opposition on the part of the asylum establishment, the Superintendent succeeded, in the course of 1876, in introducing some manufactures into the institution. Since then all the wheat used in the asylum has been ground by the lunatics. The women are chiefly employed in spinning cotton, which some of them are reported to do very well indeed. During the frequent intervals of leisure which are found necessary the patients are allowed to lounge about and smoke or amuse themselves in any way they like; and those who are musically inclined have instruments given to them.

The admissions into the Lahore Asylum numbered 128, of whom 106 were males. There was no cholera; and out of 198 fever cases only one was fatal. These results are very satisfactory considering what an unhealthy season the autumn of 1876 was.

Central Provinces.

At both the asylums of Nagpore and Jubbulpore the admissions during 1876 showed a decrease. At the former institution, Dr. Brake, who was in temporary charge during the last nine months of the year, found that the patients were suffering greatly from emaciation and scurvy, resulting from insufficient nourishment, which was due to the negligence of the Native Deputy Superintendent inducing peculations by the subordinate servants. The Deputy Superintendent was removed, and prompt remedial measures were taken by Dr. Brake.

The statistics appear to show that more cases of lunacy result from physical than from moral causes, that of the latter grief is the most common, and that among the former by far the most prevalent is the use of ganja.

Medical Schools.

Madras.

There was a general increase of students during 1876–7 at the Madras Medical College, and the progress made was fairly satisfactory, though accompanied by serious drawbacks. The Senior Department comprised 28 students, several of whom, however, left without attempting to complete the course. One first-year student proceeded to England for the prosecution of his medical studies. The professors complain of the listlessness and ignorance displayed by the Junior Department generally.

Central Provinces.

The Principal of the Nagpore School of Medicine, in reporting on its tenth session, refers very unfavourably to the general character of the students. They appear to be " a very " unpromising set, deficient in ordinary education and ability, wanting in attention and " capacity, and in many instances unwilling to work." Their conduct was so far good that there were no offences against order while in the school, but there was much irregularity, carelessness, and inattention to hospital duties. Many were willing to learn, and tried to do so, but " committing to memory by rote is their only idea of study; they swallow quantities " of words without digesting their meaning, and their minds remain only weakened and " starved."

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This unsatisfactory state of things is ascribed by the Principal to the system recently inaugurated by Government under which students are selected by a military committee after passing the prescribed test in reading, writing, and arithmetic, and are then sent for one year's preliminary training at a civil hospital before entering the medical school. This system, involving a year spent on small pay and without opportunities of study, deters, he believes, educated and energetic men from entering the service, while it holds out attractions to the idle and worthless. Under the former system the Principal and teachers of the school took care to admit only such men as seemed generally likely to succeed, and the latter at once entered upon their work with alacrity and diligence.

A similar objection to the new system on the part of the Inspector General of Hospitals in the North-West Provinces was mentioned in the last Report (p. 27); and it was stated that his views were concurred in by the Local Government, who had submitted them to the consideration of the Government of India. The Chief Commissioner of the Central Provinces likewise expressed his concurrence in the objection now raised, and his hope that the matter might receive the further attention of the higher medical authorities.

The institution itself continued to be useful, and was well managed. The lectures given by the Native Professors were specially commended. There were also some bright exceptions to the general inferiority of the students, in particular three Mahratta Brahmins of Nagpore.

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VII.—SANITATION.

Civil.

Organization of Health Departments.

Sanitary organization is much more complete in the Bombay Presidency than in any other part of India. The whole vaccination service has been brought into subordination to the Sanitary Commissioner, its officers acting as sanitary inspectors and advisers all over the country. This arrangement, which was the result of a proposal several years ago of the Army Sanitary Commission, came into active operation in 1876, and the Acting Sanitary Commissioner (Mr. Hewlett) reports well of its working. He says: "Future annual "reports will, I firmly believe, show that the cause of sanitary reform throughout this "Presidency has been greatly aided by the advice on sanitary matters which its officers "will from time to time give to local authorities, whilst a marked improvement in the "registration of births and deaths throughout the Presidency may be expected, as the village "registers will now be subjected to a more careful scrutiny than it has heretofore been "possible to give them."

In March 1877 the Sanitary Commissioner for the Central Provinces reported that the employment of the vaccination officers in general sanitary work had been found most useful during the cholera epidemic of the past two years, and was doubtless the means of bringing them into more friendly relations with the people.

Duties of Sanitary Commissioners.

It was mentioned in Vol. VIII. (p. 28) that the several Governments in India were considering the question of Sanitary Commissioners being relieved, as far as possible, from statistical duties, and devoting their time to the work of sanitary inspection and supervision.

The desired object has already, in great part, been attained in Bombay through the reorganization of the Health Department of that Presidency. In August 1876 the Bombay Government laid down in a Resolution the duties of the Sanitary Commissioner in terms calculated greatly to strengthen his hands, and to utilize his services in the most practical way.

On the general subject the Government of India have written that they are fully alive to the importance of the time and labour of the several Sanitary Commissioners being confined to practical sanitary work, but that they do not consider that the time has yet arrived for relieving them altogether of the duties connected with the registration of births and deaths.

The first step towards practical sanitary reform is to educate the people. For the attainment of this object the most important means are the mortuary statistics; and in this view the proper supervision of these statistics is a most essential part of the Sanitary Commissioner's work. Eventually, the Government add, a separate officer may be required in each province to undertake the duties of a Registrar General, but this does not at present seem called for; it would involve much expense, and the returns are not yet sufficiently accurate to warrant such appointments.

In his last report the Bengal Sanitary Commissioner expressed a hope that the time is near when all these statistics will be taken out of his hands and those of the Civil Surgeons, leaving them to deal more exclusively with the prevention and treatment of disease. The Local Government observed, with reference to this remark, that they were not yet prepared to make any change of the kind suggested, but that some arrangement would be considered whereby the Sanitary Commissioner would personally be less tied down to his head-quarters, and would be able to devote more time and attention to the duties of inspection and local inquiry.

Land Quarantine.

In October 1876 a committee appointed by the Government of India to consider the question of land quarantines in India sent in their report, and in consequence a set of rules was laid down by the Government for future observance on the outbreak of cholera or small-pox in cantonments. The rules are a modification of those printed at page 203 of Vol. III. of this series. The great principle, so far as cholera is concerned, on which both the former and the present rules are constructed is that the seat of the evil lies in local conditions, and that therefore the remedy in case of an outbreak is departure from the affected locality. Camping grounds have been selected in the vicinity of every cantonment; whenever a single case occurs, the building is to be vacated and cleansed, and when the outbreak presents symptoms of a general character, the whole garrison is to be removed at once to the camping ground. Measures of prevention are also strongly enjoined in the

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way of cleanliness, good conservancy, &c. While this general line is taken, the rules at the same time do not dogmatically assume that there is no truth in the theory of importation, but direct that very careful investigations on this point should be made in regard to every first case; and fumigation and disinfection are ordered, while soldiers are to be prevented from going into localities where cholera prevails. The revised rules, however, differ from the original ones in that they do not assume the necessity for the isolation of cholera patients. For the words "stringent orders should be issued to ensure all cases of the disease being sent "to this isolated hospital for treatment," the following have been substituted: "no persons "should be forcibly taken from their friends or removed to such hospitals under any pretence "whatever." And the following important provision is included: "It must be distinctly "understood that Commanding Officers are not authorised to establish or enforce against the "public at large, or any section thereof, any quarantine or any restrictions in the nature of "quarantine as against cholera in particular, which are not equally applicable at all times to "the control of vagrant classes of people having no legitimate ground for claiming admission "within cantonment limits. The employment of the troops to form cordons round canton-"ments for such purposes is strictly prohibited." The committee observe that "the best "arrangements could not prevent quarantine restrictions from operating harshly on thousands "of poor people, and any arrangements short of perfection must give the police and other "petty executive agency power and opportunity to practise oppression and extortion on a "vast number of persons."

In dealing with small-pox, due regard will be had to its infectious character and to the complete isolation of the patients.

Similar measures to the above are enjoined on civil officers as far as circumstances will admit. The supreme importance of measures of sanitary improvement is pointed out, and in particular when great numbers of people congregate at fairs.

Analysis of potable waters.

A despatch was addressed to the Government of India in January 1877, suggesting whether something might be done for the systematic analysis of potable waters at civil stations in India, as was done some years ago for military stations. The suggestion was party based on a representation by Mr. Thom, late Surgeon General at Bombay, as to the specially backward and unsatisfactry condition of this branch of sanitary work in his Presidency. He pointed out the comparative uselessness of samples of water being forwarded to the Chemical Analyser to be examined at a distance from their sources, and submitted a proposal for the appointment of a small staff of itinerant analysts specially trained for the work. The Government of India have decided so far to give effect to Mr. Thom's proposal that they have sanctioned the appointment of one trained assistant surgeon for a period of two years to conduct local analyses, wherever necessary, throughout the Bombay Presidency. Nothing of a systematic kind is to be done in the other Presidencies, owing to want of funds; but the Bengal Government have taken some action in this direction.

Bengal.

Sanitary progress was, as usual, not very marked in Bengal, owing principally to want of money and to the apathy of the people. In the districts, for instance, where the "Burdwan fever" has raged of late years, the Government, while pointing out that a great means of prevention would be that the people should sleep on raised beds or platforms of bamboo, or build houses of bamboo well raised from the ground, add that at present the people make no attempt to help themselves, and seem to think that it is the duty of Government to undertake house drainage and erect sleeping platforms in all their villages.

Steps were taken during the year to point out to the Civil Surgeons the localities in which unusual and persistent mortality prevailed, and to call for reports, in view to remedying, as far as practicable, the sanitary defects reported.

Of the total municipal income only about 24 per cent. was expended in works of a purely sanitary nature. These were all small works of local interest.

The scheme for the supply of water to Burdwan was finally abandoned for want of funds.

Some useful drainage operations were carried out in Midnapore and Hooghly districts.

Nine public latrines were constructed in Berhampore town, and additional land for trenching night-soil was purchased. The reclamation of a ditch 1,500 feet long by 50 broad in the heart of the same town was commenced during the year. This ditch is very deep, and has been hitherto the receptacle of all kinds of filth, and a hotbed of disease. It is now intended to excavate a large tank in the centre, and with the earth thus obtained to fill up a great part of the ditch and convert it into a public garden.

At Bogra nearly 40 pits and hollows were filled up. The drainage of this town was completed, having been commenced in 1875, and the work has been done very thoroughly.

The new burning ghât at Dacca (*see* Vol. IX., p. 31) was made good use of. This work is very beneficial to the health of the city, as it protects the riverside water from pollution.

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Efforts made to improve the sanitary condition of Chittagong appear to have been frustrated by the opposition of the native community. The following description of the place is given by the Sanitary Commissioner for Bengal :—" A century ago Chittagong was resorted to as the " sanitarium of Bengal. The walls of Sir William Jones's beautifully situated house " still stand, a decaying witness of the fact that year by year he went there to enjoy cool sea- " breeze and sea-bathing, to drink pure springwater, and to ride about among the varied " scenery of the place. Now it is renowned for its sickness and mortality. Increased " traffic brought with it a denser population, who are massed together in damp and dirty " huts, crowded and irregularly built along the lowest khals, and surrounded by ever " increasing accumulations of filth. The tanks, which are numerous—about 700—are " shallow and surface fed, chiefly from roadside ditches and the overflowings of cess-pits. " Most of the 99 graveyards are situated on the banks of the tanks or in the close compounds " of the householders. The drainage is choked up. The amiable magistrate who least " disturbs the people is best liked by them; but when I consider the sickness and mortality " that prevail among them, I know that such a magistrate is not their real or best friend."

The conservancy arrangements of the town of Patna were put on a systematic footing, and an important work of reclamation was effected there.

Calcutta.

The effect of sanitary measures on the health of Calcutta has given rise to a good deal of discussion. Where the main drainage has been completed without the attendant sewering of houses, the result has been disappointing, if not prejudicial. This was plainly owing to the impossibility of the house sewage finding any outlet from the open street drains; but it led to the idea that the drainage works were a mistake. This idea has been successfully combated by the competent authorities; while the marked benefit resulting from an organized conservancy and from a pure water-supply is clearly shown by the statistics brought together in a Memorandum of the Army Sanitary Commission (*see* p. 182.)

The operations in connection with the Calcutta drainage scheme were retarded both by the visit of the Prince of Wales and by financial considerations. The outlay in 1876 was 19,947*l.*, exclusive of the cost of the land taken up; and during the same period 2,503 premises were connected, making a total of 7,214.

There was an increasingly urgent demand for the extension of the supply of both filtered and unfiltered water. A vast quantity of the former was necessarily expended on the watering of streets. The new Corporation were prepared to support measures for the required extension, provided means could be found for paying the interest on the necessary capital without increasing the burden of taxation.

A comparison of the quality of the Calcutta hydrant water with that of London was decidedly favourable to the former.

On the other hand, the condition of the water in the tanks from which the supply in the native villages is drawn was indescribably bad, and the work of filling up these tanks was actively carried on during the year.

Writing in October 1877, Dr. Payne stated as follows :—" This year the fall in cholera " commenced in February and continued, the minimum being reached in July. This was " the period when the de-watering of tanks was actively pursued, until want of money put " an end to it in June. The number of de-watered tanks was but a fraction of those in " existence; but they were the worst, that is, those which had proved themselves poisonous " at the time. The effect produced, therefore, was in no way disproportionate to the work " done. In some places, Toltollah for example, the cleansed area bore a very large " proportion to the total, and here the reduction of cholera was most marked. * * * " It was determined, with the Chairman's approval, to issue notices to the proprietors of " all open tanks to de-water and fill them; not with the intention that this should be done " at once and indiscriminately throughout the town, but that the Commissioners should, in " every case of urgency, be enabled to act promptly at the expense of the proprietor. * * * " The only reply to the notices which has yet been made is of a very gratifying kind. " Many letters have been received containing proposed alternatives, reasonable requests for " time, and suggestions that the Corporation should do the work at the owner's cost, &c.; but " there has been little or no opposition. On the contrary, there is strong evidence that the " necessity for getting rid of the tanks as speedily as possible, with due regard to the tenants' " wants, has come to be appreciated by proprietors."*

Under the new Municipal Act powers are given to the Corporation to deal effectually with these bustees; but Dr. Payne, the energetic health officer of the city, complains very seriously of officious obstructiveness on the part of that body. The Government of India found it necessary to record the following remarks :—" It would be a matter of great regret if, through

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* *See* further remarks on this subject under SPECIAL DISEASES (p. 40).

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" the inefficient working of the present municipal arrangements, the execution of necessary " improvements should be so hampered as to force on the Lieutenant Governor the question " of reorganizing the municipal constitution in such a way as to enable it to deal vigorously " and effectively with the urgent demand for sanitary reform in Calcutta."

The views of the Local Government on the " bustee " question are thus expressed:—

" The Lieutenant Governor is willing to admit that the improvement of the bustees " can only be gradually undertaken, with due regard to the state of the municipal " finances, and that there are some special difficulties to be overcome; but he trusts the " Commissioners will see their way to some scheme for gradually and systematically dealing " with a state of things which is certainly not creditable to such a Corporation as that of " Calcutta. The first thing is to provide good water, and the people will not then be so " anxious to cling to the filthy water, which, according to Dr. Payne, is in a great portion of " the town the only supply available to them. They not unnaturally prefer bad water to no " water at all. Mr. Eden believes that the proper way of dealing with these bustees is for " the Municipality to set aside a certain amount of money every year, and to buy up block " after block of bustee, clear it, drain it, lay it out with roads, fill in all dirty tanks and " hollows, and then sell the land thus reclaimed in convenient lots for the erection of houses " for the people on plans to be approved by the Municipality. The owners of these bustees " are frequently not in a condition to pay for their improvement, even though it be shown " to them beyond question that the value of the land will be enormously improved by the " removal of nuisances and the levelling of the land. If the matter were taken up systemati- " cally by the Municipality, they would probably find that the profit of reclamation was so " certain as to warrant their raising special loans for the subject, and thus in a few years " getting rid of these great sources of disease."

As in former years, the prevalence of cholera on the riverside was greatest in those localities where the discharge of the fort sewage and emanations from the unembanked foreshore act as exciting causes. The satisfactory decision has been arrived at to connect the fort drains with the main municipal sewer, and to discontinue the practice of discharging sewage into the river. This, it is believed, will remove one of the permanent causes of cholera in the port.

Much was done during the year for the sanitary improvement of the port; the state of the river bank was carefully looked after by the new Health Officer.

The important question of the supply of pure water to the shipping was settled after much controversy. The Municipal Commissioners objected to supply water to the Port Commissioners, who had undertaken the details of the supply at a fixed rate of Rs. 4 per 1,000 gallons, which was to be paid to the Municipality, the Port Commissioners making their own arrangements with the shipping. The ground of objection was that, the water-supply being insufficient for the inhabitants of the town, it was unjust to the ratepayers to sell it to the shipping. This objection was subsequently withdrawn; but the Municipality undertook themselves to supply the water from boats fitted with iron tanks and pumps, in charge of a European subordinate, to ships not near enough to the banks to be served from the mains by hose. This arrangement may be tedious and expensive, but it is stated to be efficient.

Madras. The information received of practical measures in the Madras Presidency is even more meagre than it was for the preceding year (*see* Vol. IX., p. 33). It is in fact limited to some very minor works effected in municipal towns (*see* p. 93).

In a report on the working of the provincial municipalities for 1876–7 it is stated that during that period a sum of 1,060*l.* was laid out in extending or improving surface drainage, and that 2,359*l.* was expended on water-supply, inclusive of a sum of 498*l.* incurred in preliminary surveys in connection with a scheme for a thoroughly satisfactory system of supply for the town of Tanjore. One quarter of the total municipal income of the Presidency was spent on conservancy, the necessity for which was impressed on the authorities in connection with the famine.

The capital appears to have been in a most filthy and neglected state, and it would seem that no steps were taken to check in any degree the offensiveness and injurious effect upon health of the town drains. Negotiations were still pending between the Madras Municipality and the Government as to the incidence of the cost of the new drainage project (*see* Vol. IX., p. 145), and its execution was in consequence still delayed.

The supply of water from the Red Hills ran short, owing to the failure of the monsoon, and was moreover very impure; yet it was preferred for domestic purposes to the brackish water of the wells. Inquiries were set on foot as to the best means for improving the water-supply.

The energies of the conservancy establishment in the capital were taxed to the utmost by the influx of people into town in consequence of the famine. The plan of sewage farms was further developed, with hopeful results.

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As the "bustees" in Calcutta, so in Madras the "parcherries" are hotbeds of disease, and present a sanitary question of great difficulty. In some instances the desired improvement has been effected, but entire removal appears to be the only effectual remedy, and proprietary rights, coupled with the poverty of the owners, stand in the way of this.

Bombay.

The interests of sanitation in the Bombay Presidency received full attention from the active and energetic officer who acted during the year as Sanitary Commissioner, Mr. T. G. Hewlett. The Bombay Government placed on record the following observations respecting the work of the year:—"The Governor in Council has to thank Mr. Hewlett for the most interesting and "practical report which has yet been submitted from the Sanitary Department, and to acknowledge the unremitting labour and constant devotion to duty which have characterised Mr. "Hewlett's administration in 1876. Much commendation is also due from Government to "the several zealous officers of the Medical Department who have served under the Sanitary "Commissioner. His Excellency in Council mentions thankfully the pains taken by the "district authorities of all grades to promote the success of the sanitary operations throughout "the Presidency, and hopes that, remembering the beneficent object of these operations and "the effect of the work, if successful, on the welfare of the people, they will go on "augmenting their efforts year after year. His Excellency in Council also trusts that all "classes of the natives in the interior of the country, recognising the value of these measures "in respect to the health of the community, will afford to the authorities that full measure "of co-operation without which the efforts of Government, however well intended or skilfully "directed, can never obtain an adequate result."

The Army Sanitary Commission observe that Mr. Hewlett's report for the year "is distinguished by a real practical grasp of detail; every section of it shows evidence of this "fact, and the local authorities ought to have no difficulty in becoming acquainted with local "disease causes and in applying the required remedies."

Some important works of water-supply were carried out, of which a brief account will be found at p. 106.

Mr. Hewlett made very detailed and important inspections of the following towns, viz., Satara, Kolhapur, Belgaum, Dharwar, Sholapur, and Bijapur, and also of eight military cantonments, the reports of which were, by order of Government, printed and bound up with the four reports abstracted in the last volume (pp. 127–132). The Government expressed great appreciation of these clear and practical reports, which contain many suggestions showing how much sanitary improvement may be effected at no great cost to the municipalities.

With regard to the water-supply of the city of Ahmedabad, the medical officer in charge of the Royal Artillery there reports that the principal supply is taken from the Sabarmuttee river, below the "sewage outfall of the town, and below where the foul clothes of the "population are washed. The rest of the supply is from wells, all, or nearly all, of which I "believe to be unfit for use. One, from which a large supply appears to be obtained, may "be seen a short way outside the city walls, sunk in a large graveyard. For the two years "that I have been here, cholera has prevailed most extensively in the city during the hot "weather, and has lasted until the heavy rains have set in. In other words (as it "appears to me), when the river and wells have fallen, and when their filthy condition is, so "to say, concentrated to a certain extent, cholera at once makes its appearance, and "continues to prevail till the rain sets in, when the foul waters become sufficiently diluted "to be no longer hurtful. The matter has, I believe, been often urged on the city authorities, and different plans have been proposed, but none adopted, on the ground of "expense."

The improvements reported in the last volume (p. 14) to have been effected in regard to the discharge of sewage at Carnac Bunder were followed by a great abatement of the nuisance. The question of the general drainage of Bombay remained unsettled, and meanwhile a great amount of labour and expense was incurred in cleansing drains and removing nightsoil by hand.

The following remarks by the Acting Municipal Commissioner of Bombay will show how the drainage question stood at the close of 1876:—

"Until the water-supply is more abundant than at present no radical change from the "existing system can be effected. Government are, however, aware that the Municipality "of Bombay are now spending 360,000*l.* in improving the water-supply, and, unless "unforeseen contingencies occur, the increased supply will be available on 1st January "1879. It is then contemplated by Mr. Pedder to take up energetically the very large and "complicated question of drainage, which is beset with difficulties of no ordinary magnitude. * * * * It may be stated that the Municipality have just raised a loan "of 60,000*l.* to improve the surface drainage of Bombay, and the works in connection with

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" this important measure will be commenced immediately. It must be borne in mind that " the mortality of Bombay is considerably lower than that of Berlin, Vienna, and other cities " of Europe and America; and though this fact is not urged to support the perpetual con- " tinuance of the existing state of things, it is an argument against the mistake of sacri- " ficing everything for an immediate settlement of a question which admits of so many " conflicting opinions."

The details of Mr. Pedder's proposals were given in the last volume (p. 150).

The quantity of water available for the city of Bombay would be abundant if it were properly distributed; as it is, the insufficiency of the supply was seriously felt during 1876. The construction of a reservoir for the Vehar water on Bundarwada Hill was in contemplation, which would have the advantage of increasing the pressure in the mains. The quality of the water-supply might also, with proper precautions, be excellent, but in fact it is far from what it should be in point of purity. The causes assigned for this are, (1) want of filtration, (2) passage of the water-pipes through drains, and (3) the objectionable plan of " dipping wells." The latter is apparently the cause of more people having died of cholera who drank the comparatively pure Vehar water than those who drank well-water.

It were much to be desired that some system were organised for the thorough sanitary supervision of the ports of Bombay and Kurrachee and the medical inspection of vessels arriving there, as has been already done for Calcutta. The efficient carrying out of such a system would probably remove the apprehensions which are felt from time to time of the importation into Europe of plague and cholera.

Punjab.

Dr. De Renzy, the late Sanitary Commissioner of the Punjab, made an endeavour (*see* Vol. IX., p. 34) to instil into the minds of the people a sense of the importance of sanitary measures by holding conferences with district committees and circulating pamphlets. This appears to have borne some good fruit. In a few districts steps were being taken in 1876 to carry out some of Dr. De Renzy's suggestions.

Mr. Wakefield, the Deputy Commissioner of Sirsa, has commenced " a system of village " sanitation by persuading the proprietors of village estates to put up mud pillars 200 yards " from each other; all rubbish to be thrown and the committal of nuisances restricted to " the outside of the circle thus demarcated. By this means the clearance of the inside " circle and immediate neighbourhood of houses will be effected, and an improved sanitary " state of the village site secured."

The Lahore water-supply and sewerage project, prepared by Mr. Leslie Clark, at a total cost of upwards of 130,000*l.*, was sanctioned, and will be taken in hand as soon as the orders of the Government of India are received.

A good amount of work is reported to have been done in the various districts in the provision of drains and cleaning of wells.

At Jagraon city a large new drain was constructed round part of the city wall, which is a great sanitary improvement, preventing a quantity of muddy stagnant and noisome drainage water accumulating.

Pucca drains were constructed in the city of Peshawur for the flow of ablution and other water, ditches were filled up, and low and marshy tracts were drained. Certain streets and bazaars were widened, and the main sewer running outside the city was improved. The Sanitary Commissioner, at an inspection of this city, found it in a praiseworthy state of cleanliness, and, as compared with its condition in previous years, greatly improved in its conservancy arrangements. This improvement is the result of the new drainage system which has been recently adopted, and which is now in full work in nearly all parts of the city.

North-West Provinces.

Much energy was displayed in the North-West Provinces in regard to works of sanitary improvement. The Sanitary Commissioner states that works of this character are progressing in every important centre of population.

In Kumaon and Gurhwal earnest endeavours were made, in consequence of the ravages of " mahamurree " (*see* p. 8), to improve the condition of the towns and villages, and especially to bring into general use the custom of providing separate accommodation for the cattle. The response generally made to the request of the authorities in regard to this matter was very gratifying.

In Terai some of the largest and most unhealthy swamps were drained. Village wells in which the water had become shallow were deepened; and much work was carried out with a view to the improved sanitary aspect of village sites generally. In the principal town (Kashipur) unwholesome excavations in the site were filled up with earth, and in Jaspur town the surface of the public thoroughfares was consolidated.

The wells of Bareilly city were cleaned, and a new slaughter-house was built. In the town of Shahjehanpur improvements were effected in the drainage of the site.

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Good work was done in all the important towns of Budaon district, especially by raising and consolidating the roadways and by filling up unwholesome excavations.

In Saharanpur city 1,036*l.* was expended in sanitary improvements.

In the Meerut district the work of draining the Upper Doab country was continued, and the good effects are witnessed by the decreasing death ratios. The drainage of the city and cantonment was also well advanced. The resident magistrate has recorded his opinion that great benefit to the public health resulted from the only partial working of this scheme, in decreasing surface moisture during the rains of 1876. At Sirdhana a very foul and offensive pond was in great part filled up, and a valuable piece of land thus acquired, the rent of which will increase the municipal income considerably. Mr. Planck observes: "This form of "improvement cannot be too much praised. I mention it prominently here in hopes that "the force of example may lead to like results elsewhere." And he further remarks: "I may fairly say that every important centre of population in the district has benefited "in some degree from the energy and strong common sense of Mr. Webster, the magistrate, "whom I have known for ten years as an earnest sanitary improver wherever his authority "stretched."

A general system of drainage was created in the town of Mynpoorie, by which the line of cesspools and other depressions containing stagnant water, commencing from the south end of the town, have been united, the chief pools having been filled up. Innumerable private reservoirs of foul water which gave on to the streets and lanes of the town have been removed, small drains leading into the general system being provided to take their place.

A scheme which had been long in hand for the water-supply and drainage of Benares was still under preparation. As cholera prevails in this city every year, it is not unlikely that the efficient execution of this scheme would prove of the greatest benefit.

At Mirzapore the Khandwa nullah, which received a great quantity of refuse drainage from lac factories, and had become very unwholesome, was converted into a closed drainage way.

Oude always holds a low place in matters of sanitary administration. It may be hoped that the amalgamation with the North-West Provinces will bring about better results in future. Oude.

There was an increase of expenditure to the extent of 1,849*l.* on works having a sanitary object. The most important expenditure was on drains in Lucknow, which city is stated to have been much improved. The only other towns where any outlay of this kind occurred were Gonda, Roy Bareilly, and Bara Banki.

Some sanitary improvements were effected in the Central Provinces, principally in the construction and cleansing of wells. Increased attention was given to the water-supply; drainage was energetically carried out in some towns; and a growing appreciation of conservancy was manifest in the ever-increasing number of towns adopting or proposing to adopt the Nagpore system.* Central Provinces.

In Saugor and Damoh surface drainage was in progress. Much good work was done in towns and large villages of the Hoshungabad district in the direction of preserving the water sources pure. In Nagpore town the water-system was extended, very crowded portions of the city being now supplied.

Owing to the poverty of the Berar districts, there is very little expenditure there on sanitary works; but the people are being constantly stirred up by the Sanitary Commissioner to habits of cleanliness. An obstacle which appears insuperable at present is the fact that the assessment of land up to the very doors of the villages leaves no vacant spaces for necessary purposes or for the deposit of refuse. Berar.

At Rangoon extensive improvements took place in the drainage system both in the shape of repairs and of new works; several latrines were built; low ground was filled up; tanks were excavated; while the work of conservancy was efficiently carried out. Since the year closed, a scheme for the supply of water to Rangoon by conduit pipes leading from the Royal Lakes north of the town has received the sanction of Government; this work is expected to cost 80,000*l.* British Burma.

Useful sanitary works were likewise carried out in Bassein, Prome, and Akyab; the bazaars were cleansed and supplied with water from raised tanks, roads and drains were improved, and swampy ground was filled up.

In the province generally a great drawback to sanitary advancement is want of money. The Sanitary Commissioner visited during the year most of the towns and large villages, and

* This system was introduced in the capital in 1873. Its main features are:—
(1.) mapping out the city in defined circles of limited area;
(2.) making over the supervision of the conservancy to the town police;
(3.) combining under one establishment the conservancy of private houses with that of public latrines;
(4.) granting licenses for private latrines.

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directed improvements which the residents could themselves effect without expense; and instructions regarding conservancy drains, water, and cognate matters were printed in the vernacular for circulation.

Sanitary arrangements at Madras festivals.

The reports received year by year of the results of arrangements carried out in connection with religious festivals in the Madras Presidency form a very gratifying feature in the history of sanitary progress. The effective precautions taken to guard against the outbreak of disease at the gatherings held between November 1876 and June 1877 were followed, as usual, by the almost total absence of disease, although in some cases epidemics were prevailing in the surrounding country. To select one instance, that of Mylar, the measures taken are thus described:—"All sanitary precautions were adopted and carried out by me. "I inspected the village and ordered the removal of all rubbish, &c.; the streets and gullies "were swept out and maintained in this state by a conservancy establishment; while the "inhabitants, in accordance with their usual practice at this time, had their houses white-"washed and their grounds kept free from all nuisance. The village and the encamping "grounds were daily swept and kept clean by eleven sweepers specially employed for the "purpose." And the result was as follows:—"Though the prevalence of famine and "pestilence was the chief cause of the considerable reduction in the number of the pilgrims, "and though cholera was fearfully raging in the adjoining villages, more particularly on "the other side of the river, and though there had been some cases of the disease in this "village a few days before the festival, still I am glad to report that the festival passed off "without any complaint."

At the Masi Makram festival the sanitary officer in charge obtained leave from Mr. Wallace, the joint-magistrate, to select some ponds for drinking purposes and strictly guard them from contamination. But, on the ground that "the rule prohibiting bathing was not in "accord with the feelings of the people," the order was cancelled on the following day. The district magistrate pointed out to Mr. Wallace that the sanitary arrangements made ought not to have been deviated from; and he was also formally reprehended by the Madras Govenment for his "singular want of discretion."

Military.

European Army.

The expenditure during the financial year 1876–7 on works of a sanitary nature in connection with the whole Army (mostly with British troops in the Bengal Presidency), amounted to 725,917*l.* A summary of the principal works is given at page 77.

The Government of India have directed the appointment of local committees with a view to the sanitary supervision of native villages in the vicinity of cantonments—a matter of which the urgency has been frequently pressed by the Army Sanitary Commission.

Several improvements in connection with barracks and hospitals were carried out during 1876 in the Madras Presidency. At Poonamallee a new hospital to accommodate 90 men was commenced in September. At Bellary the surface drainage was improved, and two new barrack blocks were completed and occupied. The hospital at Trichinopoly was repaired, and its ventilation improved. At Bangalore and at Cannanore there was improvement of the drainage. At Kamptee three barrack blocks were enlarged and better ventilated, and others were in course of alteration.

An aggregate sum of 69,690*l.* was expended on military sanitary works in connection with the Bombay Army, principally on barracks at Ahmedabad, Colaba, and Aden. A large tank was cleared at Assirgurh, at a cost of 3,334*l.*; and the drainage was improved at several stations.

The water-supply for the Bombay Army was reported to be generally good and abundant. The hospital accommodation at most stations was sufficient. The Colaba station hospital, however, was "insufficient for the requirements of the station, both in number of beds and "nature of accommodation. Answering very well as a regimental hospital for the artillery "and infantry in the old barracks, it is insufficient for additional numbers now put in it; "the building has, moreover, been shut in by new barracks built close by, mostly to windward, "the latrines of which, especially, are in dangerous proximity to it." The construction of a new hospital on a fresh site was under consideration.

At the same station improvements were made by levelling the ground on which the barracks are situated, and cutting drains to promote the escape of surface water. Some swampy ground on the windward side of the barracks is a source of fever; measures for remedying this defect were in contemplation.

Bengal Native Army.

The barracks and hospitals, on the standard plan, which are gradually being built throughout the Bengal Presidency for the accommodation of the Native Army are considered by the Surgeon General to meet the recognised sanitary requirements of affording a sufficiency of superficial and breathing space, as well as of being well ventilated and well lighted, and

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of being thoroughly free from ground or wall damp in consequence of being built on raised foundations.

The regimental hospitals during 1876 generally afforded sufficient accommodation for the sick.

The equipment of the hospitals, whether as regards furniture, medicines, or surgical appliances, was complete and in effective condition; and the comfort and welfare of the sick were closely attended to by the regimental medical officers.

The trench system of latrine, which is now coming into general use, appears to be a great sanitary success, and the dislike of natives to resort to places of this kind is being practically overcome.

The drinking water used by the sepoys was generally abundant, and, with few exceptions, of good quality.

A suggestion of the Surgeon General to have one station of known unhealthiness thoroughly drained, in order to observe the effect upon health, has been favourably received by the Government of India, and the selection of a station for the purpose was under consideration.

Madras Native Army.

In the report on the Madras Native Army for 1876 assurance is given that the general conservancy of the regimental lines, latrines, bazaars, and hospitals is most carefully attended to by the medical officers, the military authorities giving all the aid in their power. The weak point is the system of hutting; the sepoy huts himself, and has no funds for improvements or proper sanitary arrangements. In many cases the sites are unhealthy, the lines overcrowded, the huts badly ventilated, and the drainage defective, entire reconstruction being the only efficient remedy.

Bombay Native Army.

In all the divisions of the Bombay Presidency the arrangements for the cleanliness of the regimental lines were carefully carried out; there was no overcrowding; the ventilation, conservancy, and general sanitary state were attended to as fully as the numerous more or less permanently faulty conditions of the lines would admit of. The improvement most urgently needed is proper drainage. The lines of the 20th N. I. at Bombay were reported to be objectionable in many respects, especially as regards locality and drainage. The Sonapore outlet drain was objectionably near to the lines of the 21st.

In several cases the proximity of wells to latrines was a cause of illness. In a tank cleaned out at Assirgurh mud was found 24 feet deep.

As a rule, the water-supply was pronounced by the medical officers to be good and abundant. The Acting Surgeon General, however, remarks: "That in many cases the "water-supply needs improvement is but too evident, and it is hardly necessary to repeat "that no rational measures of improvement can be undertaken until the varying conditions "of the water itself and of its source are in each case thoroughly investigated."

The regimental hospitals were generally well reported on with respect both to accommodation and to ventilation.

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VIII.—SPECIAL DISEASES.

Cholera.

Question of contagion.

The Bengal Sanitary Commissioner enters at some length in his annual report into the question of the communicability of cholera, and he comes to the conclusion that human intercourse does convey the pestilence from place to place, but not from man to man. This conclusion, while in its latter part it coincides with the result of the investigations of the Sanitary Commissioner with the Government of India, is in its first part at variance with the facts ably pointed out by Dr. Cuningham in his report for 1875 (*see* Vol. IX., pp. 61–66), where he showed that the imposition or otherwise of quarantine restrictions during the epidemic of that year had no effect on the spread of the disease from place to place, and that the removal of troops from an affected locality was a measure attended with the greatest benefit, the disease not being in such cases carried with the troops into their new quarters, and only (as far as the evidence went) showing itself in those quarters when predisposing local conditions prevailed there also.

The following remarks by Dr. Coates are interesting:—

"Whether cholera has a special poison of its own has not yet been demonstrated. If "there be one, it is not communicable ordinarily from the living subject—1*st*, because "inoculation with fresh cholera secretions or excretions does not induce it; 2*nd*, because "those who rub cholera patients' skins, wash their clothes, scrape up, clean, carry, and bury "their excreta, or dissect, carry, and bury the cholera corpses, do not get it; and *lastly*, "cholera-collapsed mothers do not communicate the disease to their sucking infants, though "the latter pull at their breasts, lie on their sweat-covered arms, and on their soiled clothes "and bedding. * * *

"The most ready entrance of the disease into the system is by water impregnated with "decaying organic matters. This water soon loses this power when the decaying changes "are completed, and re-acquires it when fresh decaying matters find their way into it.

"I do not know any of the phenomena associated with the origin and spread, the seasonal "and local prevalence of, and the persons affected with, the disease, with which the above "conditions are not connected.

"The adoption of sanitary measures, especially that of preserving the drinking-water "against contamination by washing of clothes in it, or by evacuations, &c., being deposited "in or on the soil near wells and tanks, quite accounts for the prevention of the "disease. * * *

"With regard to the question of food as a cause of cholera a few observations may be "made. Acescent fruits, decayed fish, new rice, &c., are constantly charged with causing "cholera, but the time when these are said to do so is only the time when foul water is "concentrating, viz., after the September and October rains, and after the March storms, and "not at other periods. The people will eat new rice, and new rice is undoubtedly aperient; "but it should be considered that the rice is first washed and boiled in bad water, and when "the aperient action has begun, foul water is taken to quench the thirst that is present, and "so the diarrhœa caused by the irritant matter may run on to cholera. * * *

"In localities where sanitary defects exist the disease is known to make its home, to "prevail with virulence, and to be most fatal. In places where the rainfall is deficient in "one year and is followed by its late appearance in the next, causing the water in the tanks, "wells, and other water reservoirs to be low, stagnant, and fœtid from concentrated organic "matters, a constant invitation is held out to cholera, which then prevails with maximum "intensity. * * *

"When the rainfall is abundant and the showers frequent the progress of cholera is cut "short, and its malignity decreases in the ratio at which the rainfall increases."

He proceeds to show that the fearful epidemic which followed in the wake of the cyclone points beyond all doubt to the conditions which incite and propagate cholera, namely, unwholesome food, a poisoned atmosphere, and, above all, impure drinking water. The consumption of damaged rice during the first 14 days after the storm was almost universal among the people; in the districts visited by the wave little or none of the rice escaped contamination by the salt water. The air for miles was tainted with the odour of decomposing bodies. The entire country over which the wave passed was deprived of fresh water;

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scarcely a tank or well escaped pollution, while streams and fresh-water springs are rare. Not only was the water in the tanks rendered brackish with brine, but was also putrid with dead organic matter; the salt water killed the aquatic plants and fish; and these, at once decomposing, rendered the water fouler than ever. Carcasses of men and animals likewise added to the corruption of the water.

Dr. Coates argues that cholera is conveyed from place to place by the movements of the Pooree pilgrims. It may be observed in passing that Mr. Pilcher's observations in the previous year (*see* Vol. IX., p. 41) led him to exactly the opposite conclusion; he stated that the facts were "not in keeping with the theory that cholera is communicated by travellers from infected "districts." Dr. Coates now observes: "Along pilgrim and emigrant routes, to and from "great fairs, central markets, and at marriage processions, cholera is of common and "unquestioned occurrence. Successive batches of men sleep, cook, eat, and defœcate at the "same resting-place day after day till the water is polluted, the soil saturated, and the air "offensive. New arrivals and the neighbouring villagers who drink this water, surcharged "with animal organic matter in a decomposing state, get the disease and perhaps carry it on "to other places in like manner." And he further states: "It is remarkable that the "Europeans living in Pooree are always exempt from cholera attacks, though they are "often surrounded by the disease to a great extent. The same holds good in Balasore "also. The cause is as plain here as elsewhere, viz., they live comfortably and drink pure "water."

These facts surely point, not to importation by human intercourse, but to the operation of local conditions induced by the habits of the pilgrims.

It is truly observed by Dr. Coates—and this is indeed the proper function of the local Sanitary Commissioners rather than the broaching of disease theories—that, "so long as no "connected history of the prevalence of cholera in any district can be furnished, the best way "to collect a useful body of facts relating to the disease is to select and record, year by year, "the history of each local outbreak in each district, showing their insanitary conditions, the "causes, as far as they have been ascertained, of the prevalence, spread, fatality, &c. of the "disease. I believe," he adds, "that a record of this description will in time be "invaluable."

The points at issue in the cholera controversy were well put by Mr. E. Chadwick in an opening address to the Health Section of the Social Science Congress in 1877, of which the following are some extracts :—

"Since then (1851) a reactionary movement took place in support of the hypothesis of "the exclusive propagation of disease from person to person by human intercourse, and for "prevention, not by sanitation, by the cleansing of places or persons on shipboard or on shore, "but mainly by checking that intercourse, by quarantines, by burning clothes, by disinfecting "goods, and by destroying germs, the assumed agents of contagion. Subsequently, however, "it has been seen that human intercourse on shipboard has been speeded by steam, and on "shore by railway transit of people in masses, comprising people with undeveloped disease, "of the nature of which they are themselves unaware, unrestrained and unrestrainable by "any quarantines; yet the spread of pestilences has not been proportionately speeded and "spread as it should have been according to the contagionist theory. * * *

"In India it has always been held that pestilence has been carried about and "introduced by pilgrimages; * * * but Mr. Robert Ellis, a Sanitary Commissioner "of Madras, * * * attacked with sanitary regulations one of them which had been the "source of frightful epidemics, and ensured protection and freedom to the moving masses. "Even in France no better views have obtained until lately. It was a belief that the King "Louis Philippe conveyed typhus about; for was it not seen that, year after year, so sure "as he went to Versailles, there was an outbreak of typhus?—as there certainly was under the "common military insanitary commands, until a medical officer, conversant with sanitation, "pointed out that the evil was due to the overcrowding of the barracks by a double popula- "tion, composed of the King's band and *entourage*, and other conditions, which being amended, "the accustomed visitation of fever was prevented, and health was maintained. * * *

"Continued observations of the movement of cholera in its great source and con- "stant seat have negatived distinctly the reactionary hypotheses, and maintained our "conclusions. Amongst other points it is shown that cholera passes over wide tracts almost "desert and with sparse population, quite away from all highways of intercourse. Closely "quarantined districts there have suffered severely from the epidemics, whilst unquarantined "districts have suffered little."

Passing to other diseases of an epidemic nature, Mr. Chadwick observed :—

"It was shown in the Rivers Pollution Inquiry that upwards of 70,000,000 pounds of "woollen rags are annually imported largely from districts where plague, fever, small-pox,

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" and loathsome diseases prevail, and that these uncleaned rags are there (in Yorkshire) " sorted by human fingers, before being placed in machines which tear and separate and " cleanse the fibre for manufacture into 'shoddy,' and that for fifty years the manipulation " has not been found injurious to the health of those engaged in it. A similar inquiry " made at Paris amongst the paper manufacturers, with a view to ascertain the propagation " of small-pox by unclean cotton and flax rags, was attended by similar results.

" These facts are stated simply as confirmatory of our conclusion that, be it as it might " with any other means of transmitting disease, there was no justification for staying the " transit of manufactured goods from any infected place, as one of them. Of the means " proposed of prevention by disinfectants, as they are assumed to be, we have had strong " evidence that they were only deodorants. * * * Admitting fully the infectiousness " of certain febrile diseases, it would be unjustifiable to trust to any supposed disinfectant for " protection. But nature has given us the means always at hand, without cost or difficulty, " of perfect safety; complete personal cleanliness of clothing as well as persons, abundance " of water, and replacing the foul infected air round the sick by dilution in the boundless " external atmosphere."

Doctors Lewis and Cunningham remarked in a letter to the Government of India, dated 6th October 1877:—

" Various experiments regarding the ultimate nature of contagion, which we have conducted " under the orders of the Government, have given results adverse to pathological doctrines " current in Europe, and have thereby subjected us to considerable criticisms, chiefly because " these results were diametrically opposed to those of like investigations conducted by Dr. " Burdon Sanderson on behalf of the Privy Council at home. We beg to be permitted to take " this opportunity of informing the Government that this distinguished authority has now " officially promulgated views identical in character with those expressed by ourselves three " years ago."

A contribution by the above-named gentlemen towards the special "Cholera inquiry" is appended to the Sanitary Commissioner's Report for 1876, and their general conclusions are given in this volume at page 81.

An interesting report has just been completed by Dr. Bryden on the cholera history of 1875 and 1876. In it he observes:—" No one has a right to deny, unless for good and sound " reasons, the conclusions of a careful and truthful observer; and, therefore, on purely scientific " grounds, I do not dissent from the proposition that epidemic cholera may be due to a " malarious miasm in India, while beyond India it may from time to time be propagated as a " typhus, or as a disease with some such natural alliance."

The scientific aspect of the question is interesting, and appears to be as far as ever from solution, but the business of the sanitarian is confined to the detection and removal of predisposing causes.

Calcutta. Dr. Payne, the Health Officer for Calcutta, connects the growing cholera mortality there during the last few years with the state of the stagnant waters in that city. He notices that wherever the people have been kept from the use of dirty water the disease has promptly ceased; and he further states: " Nowhere has there been a threatened outbreak without the presence and " the use of filthy water, nor has there been a single example of the removal of the water " which has not been followed by arrest of the disease."

The following observations by the same officer are worthy of record:—

" With the ordinary rainy season, earlier or later, there comes a great reduction of cholera. " With the return of dry weather increase begins. Autumnal cholera ordinarily culminates " in November and falls in December. The fall continues through January, and more or " less through February, when augmentation again sets in. Opinions have differed as to the " manner in which rainfall operates on cholera. * * *

" It may, I think, be stated provisionally, on such evidence as we have, that there is no " *direct or specific relation* between quantity of rain and quantity of cholera; that a heavy " fall is a powerful instrument of conservancy, washing the land, scouring the ditches, and " weakening by dilution the poison of the stagnant waters; that its effect is produced only " mechanically, depending for its kind and degree on many contingencies, the configuration " of the land, its previous hygrometric condition, the manner of the fall itself, whether it be " rapid or slow, the character of the local water-supply—all which circumstances occurring in " great variety baffle inductive efforts to discover a general law. * * *

" If now we disregard the total quantities of rain, and consider the effect of the fall on the " stagnant waters of the place, we find ourselves at once in close relation with the phenomena " of disease. The first great fall in cholera attends, not the commencement of the rains, but " the first heavy fall of rain, when the tanks are filled and their filthy contents made " comparatively pure. The tanks once filled, the heaviest rain can do no more than maintain " the condition; but the longer it is maintained by either heavy or protracted rain, or by the

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" state of the surrounding subsoil, the longer is the autumnal revival of cholera postponed. " Keeping this mediate operation in view, all phenomena that seemed contradictory in the " relation of rain to cholera resolve themselves into a closely consistent group. It will be " observed in the table that, although the cholera figures of the rainy months are low through- " out, their difference from the dry months is more strongly marked in the later years. " Before the introduction of pure water general high numbers made this difference less " manifest, and during the period of uninterrupted supply general lowness had the same " effect. Lately the variation has been much greater. The seasonal law of cholera pro- " duction had been itself affected by the pure water, and had again re-asserted itself " when supply failed. Formerly all Calcutta used bad water, and all classes contributed " to the death list. Rainfall affected only the poorer people who resorted to the ponds, " and brought about only a partial benefit. Constant water-supply affected nearly all, " and there was less room for advantage in the rains. The great demand for good water " and the widespread use of it in private houses, led to its being stopped in hours of " great need among the labouring people, who were driven back to the dirty tanks for their " supply. These are the classes among whom cholera now mainly prevails, and whose water- " supply alone is purified by rain. Hence the more marked effect of rain upon the later " sickness.

" Though the variation of cholera in the dry months is not comparable with that caused by " rain, there is still, even on the imperfect records we have, evidence of movement which is suffi- " ciently definite and constant to indicate distinct causation. During the present season it " has been noticed in several places that the disease was falling very heavily on the women " and children. In the cold months the tanks are used by those who remain at home in the " mid-day hours, viz., by the women and children principally, and only by a portion of the " men. The cold-weather variation of disease, however, has not yet been investigated in " detail, and it is better to refrain from speculations. * * *

" It is quite possible that cholera may appear where no foul water is discoverable. It is a " fact that cholera does not always appear where there is foul water. Having appeared it " does not attack every person who uses the water, and it ceases while yet the water remains. " The same objection of negative events enfeebles every doctrine of causation yet propounded. " The theory of an air-borne miasm is at fault in respect of all places which, lying in the " track of the wind, are not visited by the disease. The wind is as little suited as the water " to account for cessation of epidemics. Exemptions and cessations unexplained mark alike " the history of other diseases, to which we nevertheless devote our utmost efforts of pre- " vention. When we come to know prime causes with fulness and precision, we shall " doubtless be able to follow them in their aberrations as readily as in their normal doings; " meanwhile if, in deference to some negative points, we content ourselves with a policy of " negation, we may as well frankly proclaim our intention of letting cholera do its worst " until the ideal time when, by slow toil and after loss of thousands of lives, we may have " worked out a scheme of universal conservancy."

The Bombay Sanitary Commissioner quotes the following remarks of the Collector of Kaladgi with regard to the outbreak of cholera in his district :— **Bombay.**

" The features of the disease have been very peculiar from the commencement. Prevailing " winds seem to have had nothing to do with the spread of it, for the course it took in the " early part of the rains of 1875 was in direct opposition to the south-west monsoon. Similarly " in March, April, and May the course it took was northward, whereas the prevailing wind " would have blown it down towards the coast. It was first introduced, as far as can be " ascertained, by human contagion, and that was in a great measure the agency by which it " spread itself. It had, however, a decided direction, and no human contagion appears to " have availed to carry the germs of the disease out of the direction which it adopted."

And Mr. Hewlett himself observes :—

" The lesson I have learnt from all outbreaks that I have seen in my Indian experience is " that, leaving theories to be discussed by those who have not more earnest work to do, it is " perfectly clear that cholera is a filth poison, and that, where filth exists in food, water, air, " or soil, there the ravages of this disease will be worst, *supposing* the factors necessary for " its movement are also present. What all these factors are no man knows, but it is " sufficient for practical purposes to know that filth is one of the prime movers of cholera, " and that the surest preventive against outbreaks of the disease is that at all times and at all " seasons the inhabited area should be kept free from filth, whether consisting of garbage, " sullage, or excrement, and that the provision of a pure water-supply and of wholesome food, " and of means of effectively and rapidly removing all effete matters, are necessary, if the " ravages of the disease are to be stopped. Nothing short of these measures will be effectual, " and it is a most dangerous delusion to wait until cholera is in movement before taking " sanitary measures. There ought to be no change required in the execution of sanitary

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" work, no extra precautions to be taken when cholera comes. All such action as may be " considered necessary when the inhabited area is invaded by cholera is equally necessary at " all seasons. One thing I can say from a somewhat large experience, cholera poison cannot " become intensified in plenty of air and light."

Fever.

Causation of Indian fevers.

The Punjab Sanitary Commissioner attributes the unusual prevalence of the autumnal fevers in that province to an excessive dampness of the air and soil in the several localities affected, as the results either of floods or naturally swampy land, while he thinks that some atmospheric and climatic influences must also have been at work during the year under review. On the question whether canal irrigation tends to produce malaria, the Lieutenant Governor remarks :— " The highest mortality was in the Jullundur district, where there is no canal irrigation " whatever, but where, owing to certain peculiarities in the physical formation of the country, " aided probably by the embankments of the Grand Trunk Road and railway crossing the " natural drainage line at right angles, the successive heavy rains of two or three unusual " seasons caused the country to become water-logged. The water line in the wells rose " several feet, and the whole country became in the most insanitary condition that could well " be conceived. The same results from want of drainage are seen in the case of canal irriga- " tion in many villages of the Western Jumna Canal, which have been decimated by the same " description of fever. But unless efficient drainage system accompanies their progress, " canals necessarily become the source of malarious disease."

The high death-rate from Indian fevers as compared with that from malarious fevers elsewhere leads the Army Sanitary Commission to the opinion that they must be to a great extent enteric in their character, and therefore more dependent on "filth causes" than is generally supposed. This point is important, as in such case sanitary investigation should be directed to the discovery of causes more tangible and remediable than "malaria."

Leprosy.

Question of contagion.

The evidence brought to notice in the Report of last year (pp. 48 and 49), while it supported the view that leprosy is hereditary, was very strong, if not quite conclusive, against the theory that it is contagious. Therefore the compulsory segregation of lepers is not called for by the nature of the case; and, besides, the attempt would be hopeless to stamp out the disease by such a measure, seeing that leprosy is in the system many years before it developes itself, and that children would in numerous instances be born to leprous parents before any pretext could occur for secluding the latter.

The Royal College of Physicians, having considered certain remarks by Dr. H. V. Carter on leper statistics furnished to him by Dr. Hansen, the Acting Director of leper establishments in Norway, have expressed their opinion that, while those statistics certainly show a remarkable diminution in the prevalence of leprosy in Norway during the time that the practice of segregation has been in force, there is at the same time no sufficient evidence to justify the view held by Dr. Hansen and Dr. Carter as to *the way in which segregation operates* thus beneficially. Dr. Carter apparently forgets that the system in Norway is entirely voluntary, the patients being allowed to receive and pay visits, and to leave the hospital altogether whenever they choose, and segregation there consequently means nothing more than that special hospitals are provided for such patients. That these institutions are most desirable on sanitary and therapeutic grounds is firmly maintained by the College; and this view is also fully held and acted upon by the authorities in India.

Treatment with gurjun oil.

It was shown in the last Report (p. 50) that the numerous trials of gurjun oil in different parts of India had resulted in many cases in amelioration of the symptoms, but had failed to produce any permanent cure of leprosy. The Government of India have since reported that Dr. Dougall himself, who originated this mode of treatment (*see* Vol. VII., p. 43), admits that the very hopeful prospect which it held out has not been realized.

India Office,
12th August 1878.

HENRY HILL.

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ABSTRACTS

OF

SANITARY AND OTHER REPORTS

FOR

1876.

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ABSTRACT OF REPORT OF THE SANITARY COMMISSIONER WITH THE GOVERNMENT OF INDIA FOR 1876.

(Surgeon-Major S. C. Townsend.)

European Troops.

Sickness and mortality among European troops.

The following statement gives the general results of the statistics of sickness and mortality among the European soldiers in India for 1876 :—

Army of India, 1871 *to* 1876.

Year.	Average Strength.	Ratio per 1,000.				Total Loss.
		Admissions into Hospital.	Daily Sick.	Deaths.	Invaliding.	
1871 - -	56,806	1,449	57	17·53	43·62	61·15
1872 - -	58,870	1,597	56	24·21	43·21	67·42
1873 - -	58,769	1,328	55	15·30	44·58	59·88
1874 - -	59,308	1,357	57	13·58	43·78	57·36
1875 - -	58,409	1,337	56	17·48	40·25	57·73
1876 - -	57,858	1,361	56	15·32	38·90	54·22

Compared with the results exhibited in former years, the ratios for 1876 are satisfactory; the ratio of admissions into hospital slightly exceeds that for the previous year, but it is below the average of the five years 1871 to 1875, and both the death-rate and invaliding-rate are considerably below the rates for the previous year. The total loss from deaths and invaliding was 7 per 1,000 below the quinquennial average.

Army of India.

Period.	Average strength.	Ratio per 1,000 of average strength of						
		Admissions into Hospital.	Daily sick.	Deaths.			Invaliding.	Total Loss.
				Cholera.	All other causes.	Total.		
1871 to 1875 -	58,432	1,394	57	2·53	15·09	17·62	43	61
1876 - -	57,858	1,361	56	2·32	13·00	15·32	39	54

The mortality from cholera was slightly below the average, and from all other causes 2 per 1,000 below the average.

The chief causes of admissions into hospital bore much the same relation to each other in respect of frequency as in the previous year. Malarial fevers, as usual, caused by far the greatest number of admissions. Venereal diseases come next in point of frequency. The ratio of admissions from the latter cause was somewhat lower than that of the previous year, being 190 against 205. Cholera caused 134 deaths, enteric fever 105, hepatitis 97, apoplexy 94, and dysentery 67. The numbers of deaths from cholera, from hepatitis, and from apoplexy were fewer than in the previous year, but there was a considerable increase in the number of deaths from enteric fever and from dysentery.

In the Bengal Presidency the results of 1875 compare favourably with those of former years. The increased prevalence of epidemic cholera over the country which commenced in 1875 continued through 1876, and the mortality from this cause among the European troops was again as in 1875 above the average, but the better health of the troops is manifest in the lower death-rate from all causes and in the lower invaliding rate.

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European Army, Bengal.

Period.	Average strength.	Average annual ratio per 1,000.						
		Admissions into Hospital.	Daily sick.	Deaths.			Invaliding.	Total Loss.
				Cholera.	Other causes.	Total.		
1860 to 1869 -	39,068	1,733	66	9·04	20·81	29·85	41	71
1870 to 1875 -	36,481	1,446	·58	2·79	15·56	18·35	41	59
1876 - -	36,582	1,443	58	3·14	12·88	16·02	36	52

The diminution in the death-rate of the Bengal Presidency occurred chiefly under the head of fevers of the malarious type. Deaths from enteric fever and from dysentery were more numerous in 1876 than in the previous year.

In the Madras Presidency the results for 1876 also, on the whole, bear favourable comparison with those of former years. Cholera prevailed throughout the year with exceptional violence among the native population over the whole of the Madras Presidency, and we consequently find the cholera death-rate of the European troops above the average of former years, but, notwithstanding this, the death-rate from all causes was below the average, and the diminution in the total loss from deaths and invaliding was 9 per 1,000 below the average.

European Army, Madras.

Period.	Average strength.	Average annual ratio per 1,000.						
		Admissions into Hospital.	Daily sick.	Deaths.			Invaliding.	Total Loss.
				Cholera.	Other causes.	Total.		
1860 to 1869 -	11,524	1,399	61	1·07*	18·92	19·99	49	69
1870 to 1875 -	11,161	1,194	57	1·01	15·37	16·38	49	66
1876 - -	11,034	1,131	55	1·54	14·23	15·77	41	57

Hepatitis and heart disease were diseases from which the mortality was less in 1876 than in former years. On the other hand, the deaths from enteric fever and apoplexy were much more numerous.

The results for the year in the Bombay Presidency show a lower admission-rate, but the daily sick-rate was equal to the average of former years. The cholera death-rate is remarkable for the fall from 5·30 per 1,000, the rate for 1875, to ·19 per 1,000. Cholera was not epidemic over so wide an area of the Bombay Presidency in 1876 as in the previous year. The death-rate of the European troops from all causes in Bombay was more than 5 per 1,000 below the average of the six previous years. The number invalided was, however, considerably in excess of the average, and the total loss was above the average instead of being below, as in the other Presidencies. In this respect the results of the year in Bombay compare unfavourably with those of the other Presidencies.

European Army, Bombay.

Period.	Average strength.	Average annual ratio per 1,000.						
		Admissions into Hospital.	Daily sick.	Deaths.			Invaliding.	Total Loss.
				Cholera.	Other causes.	Total.		
1860 to 1869 -	11,282	1,565	56*	5·52*	16·02	21·54	33	54
1870 to 1875 -	10,424	1,433	53	3·02	14·63	17·65	39	57
1876 - -	10,242	1,317	53	·19	12·11	12·30	47	59

The health of the troops was best in the month of March in Bengal and Madras; in Bombay, January was the healthiest month. The ratio of sickness was highest in October in Bengal and Bombay; in Madras it was highest in September. In all three Presidencies malarial fever contributed more than any other disease to the admission-rate. The admission-rate from this cause was much lower in Madras than in the other two Presidencies.

* For 1865 to 1869; figures for previous years not known.

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The difference, however, is chiefly in the intermittent or milder form of the disease. The admission-rate of Madras from remittent fever is very little below that of Bengal, while it greatly exceeds that of Bombay. The death-rate of Bombay from this cause is also much below that of the other Presidencies.

In the admission-rate of the Bengal Presidency dengue forms an important component, which is nearly absent from the Madras rate, and quite so from that of Bombay. The admission-rate of apoplexy for Bombay is lower than the rates for Bengal and Madras, and the difference is more marked with respect to the death-rates from this cause of the three Presidencies, and to the mortality relatively to the number treated. Cases of apoplexy were not only less frequent, they were also less fatal in Bombay in 1876 than in the other two Presidencies. In the previous year the reverse had been the case; the admission-rate and death-rate from apoplexy in Bombay had greatly exceeded the rates of Bengal and Madras. Cases of dysentery were more than twice as frequent in Madras as in Bengal and Bombay; diarrhœa and hepatitis also form larger components of the admission-rate in Madras. The low rate of admissions from spleen disease in Madras corresponds with the comparatively small number of admissions from intermittent fever; respiratory diseases and rheumatism contribute much more to the admission-rate of Bengal than to that of the other two Presidencies. The death-rate from respiratory diseases of Bombay is, however, very little below that of Bengal. The admission-rate from venereal diseases is highest in Bengal, but the rates of the other two Presidencies are not much below it. The two following statements show the ten forms of disease which prevailed to the greatest extent in each of the three Presidencies :—

Admissions per 1,000.

Bengal.		Madras.		Bombay.	
1. Malarial fevers	558	1. Malarial fevers	200	1. Malarial fevers	507
2. Venereal diseases	195	2. Venereal diseases	184	2. Venereal diseases	179
3. Wounds and accidents	98	3. Wounds and accidents	94	3. Wounds and accidents	98
4. Respiratory diseases	81	4. Abscess and ulcers	92	4. Abscess and ulcers	95
5. Abscess and ulcers	77	5. Dysentery	64	5. Respiratory diseases	53
6. Rheumatism	65	6. Hepatitis	63	6. Diarrhœa	47
7. Diarrhœa	49	7. Diarrhœa	61	7. Hepatitis	44
8. Hepatitis	46	8. Respiratory diseases	60	8. Rheumatism	43
9. Dysentery	27	9. Rheumatism	43	9. Dysentery	28
10. Dengue	18	10. Eye diseases	14	10. Eye diseases	21
Total of the ten	1,214		875		1,115
Total from all causes	1,443		1,131		1,317

Deaths per 1,000.

Bengal.		Madras.		Bombay.	
1. Cholera	3·14	1. Hepatitis	2·00	1. Hepatitis	2·24
2. Apoplexy	1·77	2. Enteric fever	1·99	2. Enteric fever	1·86
3. Enteric fever	1·75	3. Apoplexy	1·90	3. Injuries	1·75
4. Hepatitis	1·42	4. Dysentery	1·72	4. Dysentery	·98
5. Phthisis pulmonalis	1·12	5. Cholera	1·54	5. Heart diseases	·98
6. Dysentery	1·04	6. Injuries	1·45	6. Phthisis pulmonalis	·98
7. Heart diseases	1·01	7. Heart diseases	1·27	7. Apoplexy	·78
8. Injuries	·80	8. Phthisis pulmonalis	1·00	8. Respiratory diseases	·78
9. Respiratory diseases	·79	9. Malarial fevers	·46	9. Suicidal deaths	·59
10. Malarial fevers	·71	10. Suicidal deaths	·36	10. Malarial fevers	·29
Total of the ten	13·55		13·69		11·23
Total from all causes	16·02		15·77		12·30

Sickness and mortality in groups: Bengal proper.

In Bengal proper the admission, daily sick, and death-rates were all below the mean rates of the Presidency. Of the three stations which compose this group, Fort William continues, as in the statistics of the previous year, to hold the highest place in respect of health. The number of admissions from fever, dysentery, and diarrhœa from among the soldiers quartered in the Fort is remarkably low compared with the admissions from the same diseases at Barrackpore. The admission-rate from fever, dysentery, diarrhœa, hepatitis, and diseases of the respiratory organs at Barrackpore was extremely high.

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Gangetic Provinces and Oude.

In the second group the admission and death-rates were above the average of the Presidency. These high rates resulted from cholera, which affected the troops in six out of the ten stations of which the group is composed, from heat apoplexy, the admissions from which were above 10 per 1,000 in four of the stations, and from numerous cases of enteric fever at Fyzabad and Lucknow. The stations of Futtehgurh and Benares exhibit the lowest death-rates, only 8·3 per 1,000; on the other hand, the death-rate of the small detachment quartered in the Fort of Chunar was 73·5 per 1,000.

Meerut and Rohilkund.

The Meerut and Rohilkund group consists of seven stations. The admission and death-rates of this group were below the average of the Presidency; cholera affected the troops in two of the stations, but heat apoplexy and hepatitis were the causes that contributed chiefly to the death-rate. The admission-rate from malarial fever is much below that for the previous year, and this diminution is chiefly the result of the less prevalence of this cause of sickness at Meerut.

Agra and Central India.

The Agra and Central India group includes seven cantonments. The admission-rate was higher than the rate of the last group, the difference being chiefly due to the greater prevalence of intermittent fever, but the death-rate was less than half the mean death-rate of the Presidency. The station of Jubbulpore yielded the remarkably low death-rate of 3·54 per 1,000; that of Morar was only 6·38; the death-rate of the garrison in the Gwalior citadel was, however, high, 21·60 per 1,000. Saugor was the only one of the seven stations in which the European soldiers suffered from cholera. Here there were five cases, of which one was fatal. The number of admissions from fever at Jhansi was very high.

Punjab.

The Punjab group contains the largest European force in India. The admission and death-rates were both above the mean rates of the Presidency. Malarial fevers, which contributed nearly half the number of admissions, were more prevalent than in the previous year. But it is remarkable that, while the prevalence of fever among the troops occupying the stations of this group was generally much greater than in the previous year, the admission-rate from this cause of the troops forming the Peshawur garrison was less than half that of 1875. Of the large stations in this group, the rate of admissions from fever was highest at Meean Meer, Mooltan, Jullundur, and Umritsur. Cholera attacked the European soldiers in five of the 14 stations, 57 of the 72 cases occurring at Peshawur. Of the 16 deaths from enteric fever returned from this group, six, or more than one-third, occurred in the force quartered at Ferozepore. Of the 70 cases of heat apoplexy, 36, or more than half, occurred in the three Indus stations of Peshawur, Attock, and Nowshera. Five soldiers died from this cause out of the small force (169) stationed at Attock. The death-rate of the force quartered at Umritsur was only 6·27 per 1,000; of the force at Umballa 8·37 per 1,000. Excluding cholera, the death-rates of Rawul Pindee and Peshawur (6·58 and 8·28) were equally low. The small garrison of the Fort of Lahore yielded the highest death-rate of this group, viz., 32·05.

Hill stations.

The average number of European soldiers occupying the hill stations of the Bengal Presidency was greater by nearly 1,000 than the number of the previous year. The mean admission-rate of the 11 stations composing this group was slightly higher than the rate of the preceding year, and the death-rate was 13·35, against 8·31, the rate of 1875 for this group. This higher death-rate was the result of cholera at Murree, and of enteric fever and dysentery at Ranikhet, Subathu, Dugshai, and Cherat.

Convalescent depôts.

The cholera death-rate of the hill convalescent depôts is higher than that of any other group in the Bengal Presidency; this, however, was entirely due to the outbreak at Murree, where the disease fell with extreme severity on the convalescents at the depôt.

Rajpootana, Malwa, Sind, and Aden.

Among the troops serving in Rajpootana, Malwa, Sind, and Aden, the rates of sickness and mortality were below the mean for the Army of India. Cases of cholera occurred at Deesa, Ahmedabad, and Kurrachee. The admission and death-rates from enteric fever in this group, 6 and 2·61 per 1,000, were comparatively high. Cases occurred in seven of the ten stations composing the group, but the greater numbers were returned from Neemuch and Mhow.

Deccan and Nagpur.

The rates of sickness and mortality among the troops serving in the Deccan and Nagpur were below the mean rate of the Army of India. Though cholera was prevalent in the course of the year among the native populations of all the stations composing this group, in Poona and Secunderabad only were the European soldiers affected. In Poona one case only occurred, and this did not prove fatal. In Secunderabad there were seven cases among the men, of which three were fatal: eight among the women, all of which were fatal. Enteric fever, hepatitis, and apoplexy were returned from Kamptee in May and June. The advent of the monsoon rains was delayed in this part of India until the beginning of July, and the weather at this time was intensely hot. Moreover, the 33rd Regiment, in which these cases chiefly occurred, had arrived from England only in the previous cold weather.

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Southern India.

The Southern India group comprises eight stations in the Madras Presidency. The admission and death-rates were below the mean rates of the Presidency. The admission-rate from fever was comparatively low in all the stations composing this group; 12 cases of cholera occurred, three in Bellary and nine in Madras. Hepatitis was the chief cause of mortality. Of the total of 14 deaths from this cause, 7 occurred in Bangalore.

Burma and Pegu.

The next group includes three stations in British Burma and Port Blair in the Andamans. The sick and admission-rates were considerably below the mean rates of the Army of India. The admission-rate from fever was below that of any other group. Dysentery is the disease that contributes more than any other to the sickness and mortality. The death-rate, after adding 10 deaths that occurred among the men invalided from this group, was 17·29 per 1,000, which is considerably above the mean rate of the Army of India.

Cholera.

Cholera was more or less prevalent among the native population of all the provinces of India during 1876, and it appeared among the European soldiers in a large number of the stations and cantonments. Cases occurred in 18 out of 57 stations in the Bengal Presidency, and in 10 out of 36 stations in Madras and Bombay. But in two stations only, Peshawur and Murree, did any serious outbreak occur.

In Fort William three cases occurred, two in March and one in May; in Barrackpore and Dum-Dum one case occurred in each place.

In Dinapore six cases occurred in April, three of which were fatal. Cholera had been prevalent in the villages surrounding the cantonment since the latter end of March. The first case among the Europeans occurred in a man confined in the cells on the 15th April. Two other cases followed on the 16th and 17th in men also confined in the cells. The three other men attacked had been in the neighbouring villages in search for liquor. An enquiry was made into the condition of the cells and their surroundings, but no facts that could be supposed to have relation to the cause of these cases of cholera were elicited beyond that the two prisoners first attacked had been employed in digging over ground near a latrine used by the natives attending the Magistrate's cutcherry.

In Cawnpore three cases occurred in April among the men of the 1-3rd Regiment (Buffs), and three in August among the men of the Artillery. The cases in the 3rd Buffs appeared to have been contracted as the Regiment was leaving Calcutta, or while on its way to Cawnpore by railway. The cases in the battery of Artillery occurred, two on the 28th August, and one on the 29th. Cholera had been prevalent in June and July in the city and cantonments among the native population, and a sergeant employed at the Harness Factory had been attacked on the 13th August.

In Fyzabad two cases occurred in May, both of which were fatal. Cholera had been prevalent in the district and city for some time previously.

Cholera became epidemic in the district of Lucknow in May, and in the same month three fatal cases occurred in the city and two in the Central Jail. The first cases among the troops occurred on the 31st May. On that day two fatal cases occurred in the 6th Native Infantry, and on the same date the wife of a sergeant in the Artillery at Fort Muchee Bawan, near the city, was attacked. On the 5th June two more cases occurred in the Fort. On the 6th the Fort was vacated by all save 20 men; the married men and families went to Bibipore, and the single men to Alumbagh. No fresh cases occurred among the latter, but one woman died at Bibipore on the 6th. On the 11th an artilleryman, attending a case of fever in the Fort, was attacked, and died the same day. On the 17th, 18th, and 22nd, cases occurred in the military prison, one case on each day; two of them were fatal. On the 23rd the prisoners were moved under a guard to camp at Bithowlee. No fresh cases occurring among them, and the weather being intensely hot, the prisoners were brought back. On the 12th August the disease again appeared in the military prison; one case occurred on that day, and two more on the 17th. The prisoners were again moved to Bithowlee, and no more cases occurred among them. On the 22nd August the Pay Sergeant, 9-19th Royal Artillery, was taken ill and died. There were in all 12 cases among the Europeans, eight of which were fatal, and three among the Native troops, all of which were fatal. Prior to the second outbreak in the military prison, a European (a private individual), residing about 200 yards from the prison gate, was attacked with cholera.

In Allahabad cantonment there was no severe outbreak of cholera, but the disease hung about the station for a long time. It became epidemic in the district and city in March and April, but no cases occurred among the troops till the begininning of May. On the 5th it appeared among the 34th Native Infantry, and on the 6th a man of the Native Cavalry was attacked. These regiments were located at different ends of the station, several cases occurring in each of the regiments. In the course of the next few days both were moved into camp, when the disease stopped. No cases occurred among the Europeans till the 31st July, when a woman living in the married quarters of the 3-21st Royal Artillery was attacked, three other cases occurring between the 31st July and the 5th August. The

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battery was moved into camp, after which no more cases occurred. Between the 18th and 20th August, three cases occurred in two companies of the 5th Fusiliers occupying the same barrack. The men were moved, one company into a spare barrack, and the other into camp, and no more cases occurred in either company. On the 2nd September a case occurred in the E-12th Battery, Royal Artillery, a second case occurring on the 3rd and another on the 5th; the men were moved into camp; no case occurred in camp till the 27th September, when a gunner was attacked, but the case was not fatal. The camp was moved to another ground; a camp follower died of cholera in the new ground, but there were no more cases among the men. Five cases occurred among officers' servants and camp followers, four of which were fatal.

In Bareilly eight cases of cholera occurred among the European troops between the 1st and 29th August; seven of these cases, six men and one woman, belonged to the 1-18th Regiment, and the other was a woman of the 6-19th Royal Artillery. Cholera had been prevalent in the district of Bareilly since the beginning of May, and on the 14th July it broke out in a village two miles to the east of cantonments. It was very prevalent in the town of Bareilly and the cantonment bazaar through August.

In Saugor five cases occurred among the European soldiers, but one only proved fatal; three of the five men attacked belonged to the 1-11th Regiment, two to the battery of Artillery. Spreading from the Nerbudda Valley through Bhopal, cholera had reached the district of Saugor in the last week of May; the first case occurred in the town of Saugor on the 31st May, and the epidemic continued very prevalent there through June, July, and August. The first case in cantonments occurred in the Sudder Bazaar on the 6th June. The first case among the European soldiers occurred on the 30th June, the last on the 13th July. The two men first attacked, one on the 30th June, the other on the 4th July, had both been on duty in the Fort, which is situated in the middle of the town.

In Sialkot nine cases occurred among the Europeans, one officer, one non-commissioned officer, four privates, and two women of the 72nd Highlanders, and one private of the 3rd Lancers. The Artillery escaped altogether, and there was only one case among the Native troops; three of the cases in the 72nd Highlanders occurred in the hospital compound. Cholera had broken out in Jummoo, belonging to Cashmere, 27 miles from Sialkot, on the 4th August. It appeared in the town and cantonment of Sialkot on the 26th, and the Medical Officers' reports concur in stating that the appearance of the disease in Sialkot coincided with the arrival of refugees from Jummoo. The first case among the Europeans was a private of the 3rd Lancers, who was attacked on the 3rd September. The last case, on the 29th, was that of a woman belonging to the 72nd Highlanders.

At Murree severe outbreaks occurred among the convalescents at the depôt and among the detachments of several regiments encamped at Gharial on the Cashmere road between three and four miles from Murree. Cholera had been prevalent in Cashmere since the beginning of the year, and common opinion attributed the appearance of the disease in Murree to importation from thence. The evidence, however, on this point is not conclusive. It appears from the report of Dr. Bellew, the Sanitary Commissioner for the Punjab, that several fatal cases of illness occurred in the Murree Sanitarium in the course of May and June, which were not at the time recognised as cholera, but which Dr. Bellew, from information that he subsequently elicited, believes were cases of true cholera. The disease, however, did not become epidemic in the station till after the heavy rains of July had set in.

The detachments encamped at Gharial, the aggregate strength of which was 1,250 men, remained free till the 30th July. On the 28th the convalescents of the depôt, who had been moved into camp on account of the outbreak of cholera among them, arrived at Topah, the hill of which Gharial is a spur, and about 1,600 yards distant. The first persons belonging to the Gharial camp were two sweepers, attacked on the 30th July and 1st August. The first case among the Europeans occurred on the 3rd August, and between this date and the 25th, 23 persons were attacked, of whom 13 died. The greater number of the cases having occurred in F. Company of the 2-9th Regiment, their camp was moved on the 13th August. On their vacating this ground, their tent-platforms were scraped and the drains freshly dug out. While this was being done, a most offensive odour was perceptible.

At Rawul Pindee there were nine cases among the European troops including women and children, seven of which were fatal: five of these cases occurred among the men of the 2-9th Regiment, and four cases—one man, one woman, and two children—belonging to the 4th Hussars. In the 4th Hussars the outbreak was confined to the married quarters. In the two Regiments of Native Infantry quartered at Rawul Pindee four cases occurred. Rawul Pindee is about 30 miles from Murree, and there is constant communication between the two places. Cholera, as before stated, had become epidemic in Murree between the 13th and 18th July. The first case occurred in the town of Rawul Pindee on the 19th July; in the Sudder Bazaar on the 28th. The first case among the Europeans occurred on the 3rd August.

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Cholera prevailed severely in September and October among the European troops stationed at Peshawur. Prior to the outbreak here, the epidemic had become prevalent in July in the districts of Rawul Pindee and Hazara, east of the Indus, and also in the Swat territory, which lies on the west of the river and borders Peshawur on the north. In anticipation of the epidemic extending to Peshawur, the European portion of the garrison was reduced so far as was practicable by sending detachments to Nowshera, which in former epidemics had experienced immunity.

The first-known cases in the district occurred on the 13th September, when two women were attacked in the town of Peshawur. No cases were reported on the 14th, but on the 15th two more cases occurred in the town; and from that date cases were reported daily in increasing numbers till the 29th, when 23 cases occurred. During the next eight days the number of cases reported daily was fewer, but on the 9th October it rose again to 24, after which the epidemic declined rapidly, but did not finally cease in the city till the 9th November. Few cases occurred in the district elsewhere than in the town till after the 1st October. The epidemic spread rapidly after the 8th, and attained its maximum of prevalence between the 18th and 23rd, when 187 cases were reported; it then declined, but did not finally cease till the 20th of November. The first case in cantonments occurred on the evening of the 27th September, when two men belonging to the Company of Sappers and Miners who had been on quarantine sentry duty during the day were attacked. No cases were reported on the 28th, but in the course of that night and the following day cases occurred in the B. Battery, F. Brigade, Royal Horse Artillery, and in the 8th and 51st Regiments; on the 30th a case occurred in the 4th Battery, 13th Brigade; in fact, between the 28th and 30th cholera appeared in all sections of the European garrison, with the exception of the H. Battery, 8th Brigade, Royal Horse Artillery, which remained free till the 7th October. On the 29th also two cases occurred in the 30th Punjab Infantry, and one case in the Bazaar of the 14th Sikhs.

All the affected corps were at once moved into camp, with the effect apparently of stopping the disease. The B. Battery, F. Brigade, had 10 cases by the morning of the 30th September. They marched on that morning four miles from Peshawar. One case occurred during the day and three early the next morning (the 1st). They marched to Boodin, five miles farther, that day, and halted on the 2nd. On this day two cases occurred, one a soldier and the other a camp-follower. On the 3rd the men moved two miles farther, and after this date no more cases occurred.

In the H. Battery, 8th Brigade, no cases occurred till the 7th October, when a child was attacked. The battery was placed under canvas, and marched on the 8th along the same route as that previously taken by the B. Battery. It reached Boodin on the 9th, when the second and last case occurred. On the 11th the battery crossed the Cabul River and joined the B. Battery at Nisutta. In the 4th Battery, 13th Brigade, three cases occurred on the 30th September and 1st October—two patients in hospital and one from the barrack. The battery marched from cantonments by the Trunk Road on the 3rd October, and no case occurred subsequently.

The 8th Regiment had two cases on the morning of the 29th, one a man in hospital, the other a child in No. 9 barrack. On the 30th a detachment of two officers and 191 men marched to Pandu on the road to Jalozai, where one case occurred. On the 1st they marched to Oormur, where seven cases were admitted. On the 2nd they reached Jalozai, where two cases occurred; these were the last. The detachment crossed the Cabul River on the 7th and remained in camp till the 25th November. After the march of this detachment no cases occurred in the portion of the Regiment remaining in Peshawur till the 4th, when a sergeant was attacked, and as other cases occurred in the course of the next two days, a second detachment of the Company marched on the morning of the 7th to Gurhi Sirdar, 4½ miles from cantonment, on the Trunk Road, where they were joined on the evening of the 8th by F. Company and families; here they had two cases. On the 11th they reached Nowshera Tahsil, where they had three cases. On the 12th they crossed the Cabul River to Kundar. One case occurred here, and two more at Bari Bunda on the 14th and 15th. On the 16th another move was made, but no more cases of cholera occurred. After the march of the second detachment, an officer belonging to the Regiment was attacked on the 11th October.

In the 51st Regiment a case occurred on the night of the 28th September in the upper story of one of the new double-storied barracks. This barrack was at once vacated, and on the morning of the 1st a detachment of four officers and 169 men followed in the wake of the 8th King's, which had marched on the previous day. Not a single case occurred in the detachment after they started, notwithstanding that they followed the cholera-stricken detachment of the 8th for three marches, being only one day's march behind them. On the 2nd this detachment reached Oormur (where the 8th had seven cases), and on the 3rd Jalozai, and on the 6th crossed the Cabul River to Kundur.

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After this detachment had marched on the 1st October, there remained in the barracks 44 men, 11 women, and 25 children. Of these one man, a patient in hospital, was attacked on the 4th, two on the 7th from separate barracks, one on the 10th, a man in hospital, and one on the 23rd, a woman also in hospital.

The B. Battery, F. Brigade, Royal Horse Artillery suffered the most severely of the different corps. The H. Battery, 8th Brigade, escaped with a very light attack. Of the two Infantry Regiments, the 8th suffered much more severely than the 51st. The men and children suffered in nearly equal proportion; one officer out of 34 was attacked and one woman out of 60.

The Native troops suffered much less severely than the European; 42 cases, 19 of which were fatal, occurred in the total strength of 3,462. Two brigade cholera camps were formed at a little distance from cantonments, and as portions of each regiment were affected, they were despatched to one or other of these camps. No cases of cholera occurred in either of the camps.

In the reports of the several Medical Officers no light is thrown on the cause of the severity with which epidemic cholera falls on the European soldiers stationed at Peshawur, or on the local condition which in this epidemic rendered one corps more amenable to the infection than the others. The prudent measure of sending away large detachments as soon as it was known that cholera was spreading towards the valley obviated all overcrowding. Conservancy and cleanliness are stated to have been well attended to. The water-supply is drawn from two sources: for drinking and cooking it is ostensibly drawn from wells, the water of which is said to be good; for ablution the water of the open canals that run through the station is used. This is acknowledged to be liable to pollution, and where two sources of supply are open to the water-carriers, there can be no certainty that the supply for drinking and cooking is not often drawn from the source that is most accessible, or that the same vessel is not used for the conveyance of the impure as well as the pure water.

Whatever may have been the local condition that rendered the Europeans liable to cholera, they left it behind them when they marched from cantonment. Altogether six detachments marched from cantonments. In two of these no case occurred after moving. In one a case occurred the day following removal. In two the last case occurred on the third day after removal. In one a case occurred on the eighth day after removal: this was the 2nd detachment of the 8th Regiment which had suffered severely in cantonments, and the move was not made till ten days after the outbreak. This detachment had, in fact, remained for eight days longer subject to the insanitary condition which had from the first rendered this regiment especially amenable to the effects of the infection. The country on the left bank of the Cabul River was the ultimate destination of all the detachments, and here they remained in good health till the middle or end of November. The freedom of the troops from cholera while in this locality was not due to their having marched beyond or out of the area of epidemic prevalence, for cholera, in fact, continued to prevail in the villages in that part of the Peshawur district during the whole time that the troops were located there. It was due to the fact that the local condition, whatever it may be, which favors the communication of the infection of cholera, or which renders individuals liable to its effects, was not present in the localities selected for their encampments.

It is worthy of record that the health of the troops remained exceptionally good while encamped in this part of the district. Although they remained in camp during the season when fever is usually most prevalent in the Peshawur valley, they apparently suffered less than would have been the case had they remained in cantonments. In 1875 the admission-rate from fever of the group of stations which includes Peshawur was 855 per 1,000, that of Peshawur itself was 2,622 per 1,000; in 1876, the admission-rate of the group was 928 per 1,000, that of Peshawur itself was 1,043.

Small-pox. Twenty-two cases of small pox were admitted for treatment during the year from the whole Army of India. Of these cases, 6 occurred in the Bengal Presidency, 2 in Madras, and 14 in Bombay; none of them proved fatal.

Enteric fever. The number of cases of enteric fever in the Army of India during the year amounted to 264, being 98, or nearly 60 per cent., in excess of the number returned in the previous year; the deaths from this cause numbered 105, against 84 in 1875,—the mortality in proportion to the number of cases being somewhat less. The admissions from this cause equalled 4·6 per 1,000, and the deaths 1·82; the death-rate for the previous year was 1·44. In Bengal the admission-rate from this cause was 4·7 per 1,000, and the death rate 1·75. In Madras the admission and death-rates were 4·4 and 1·99 per 1000, and in Bombay 4·3 and 1·86. Of the stations in the Bengal Presidency, Fyzabad, Lucknow, Ferozepore, and Cherat returned the highest number of cases. In Fyzabad they amounted to nearly 20 per 1,000 of strength, and in Ferozepore to 18 per 1,000. The numbers returned from Sitapur and the Fortress of Gwalior, and also from the hill stations of Dagshai and Subathu, were high in proportion to the strength of the troops quartered at those stations. In the Bombay Presidency,

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Neemuch returned the highest mortality from this cause; the number of cases being equal to 25 per 1,000 of strength; in Poona also the number was high in proportion to strength. In Madras, 38 out of 49 cases of enteric fever occurred in Secunderabad, the number being equal to 16 per 1,000 of the strength; and 5 cases were returned from the hill station of Wellington with an average strength of 449. This great prevalence in certain stations of a disease so dependent on local insanitary conditions as enteric fever calls for close enquiry. One of the most unsatisfactory features of the subject is the increasing prevalence of this disease in the hill stations.

It is by no means the case that the larger numbers of cases of enteric fever occur in those stations where malarial fevers are most prevalent. In Fyzabad and Lucknow the admission-rate of malarial fevers in 1876 was not high. In Secunderabad it was comparatively low. In Ferozepore, where 18 cases of enteric fever occurred, the admission-rate from malarial fevers was 943 per 1,000, but at Meean Meer in the same group of stations the fever admission-rate amounted to 1,547 per 1,000, and only two cases of enteric fever were recorded, neither of which was fatal. In Lucknow and Fyzabad, where this disease was of most frequent occurrence, the greatest number of cases occurred in May and June, the hottest and driest months of an unusually hot and dry year. Of the 18 cases of enteric fever recorded at Ferozepore, 17 occurred in the three months, January to March, when malarial fevers were least prevalent; one only in the three months, September to November, when malarial fevers were most prevalent. Of the 52 cases recorded in all the stations of the Punjab, seven only occurred in the four months when malarial fevers chiefly prevailed. In the hill stations the months of May, July, and August furnished the larger number of cases. In the stations of Madras and Bombay they occurred most frequently in the months of August and September. From Burma only one case was returned, and that occurred in Thyetmyo in August. Two cases occurred in Aden, one in April, the other in June.

Malarial fevers.

Malarial fevers were, on the whole, more prevalent among the European troops in India in 1876 than in the previous year; the admission-rate from intermittent and remittent fevers of the Army of India for 1876 being 480 per 1,000, against 445 for 1875. The excess, however, was solely in fevers of the intermittent type. The death-rate from malarial fevers was much lower for 1876 than for 1875, the rates for the respective years being 0·59 and 1·04.

In Bengal proper and in the Gangetic provinces both intermittent and remittent fevers were more prevalent in 1876 than in the previous year. This also was the case in the stations of Agra and Central India and in the hill stations. In Rohilkund and Meerut, while fevers of the intermittent type were less prevalent than in 1875, remittent fevers were somewhat more prevalent. In the stations of the Punjab, on the other hand, there was a considerable increase in the number of admissions from intermittent fever and a decrease in the cases of remittent fever. In the stations of the Bombay and Madras Presidencies there was no marked difference in the fever admission-rates of the two years.

The European troops suffered least from malarial fevers in Burma and Pegu, and the number of cases in proportion to strength was not much greater in the stations of Southern India. Of groups of stations in the Bengal Presidency, the hill stations and the Gangetic group shew the lowest rates of admissions from malarial fevers; the Punjab group by far the highest. The contrast between the prevalence of fever in Burma and the Punjab is remarkable. In Rangoon, from an average strength of 764, 57 cases of fever were admitted in the course of the year. In Meean Meer, from an average strength of 886, the number of admissions amounted to 1,369.

From the whole Army of India the number of admissions from fever was lowest in the month of March, highest in the month of October, the numbers being for March 1,004, for October 4,714; but the increase in prevalence was not continuously progressive from March to October, and the minimum and maximum did not fall in these months in all the different groups. The prevalence of fever generally rises in the months of April and May, falls during the next two or three months, then rises through August and September to its maximum in October and November, when it again falls. In Bengal proper the fewest number of admissions occurred in June, the greatest in November. In the Gangetic provinces the minimum of prevalence fell in January, the maximum in May.

Apoplexy.

Cases of heat apoplexy occurred with much less frequency in Bombay in 1876 than in the previous year. In the Bengal Presidency the cases were more numerous, but not so fatal. In Madras they were both more numerous and more fatal. Cases of apoplexy occurred in the greatest numbers in the stations of Kamptee and Secunderabad, belonging to the Nagpore and Deccan group, in Fyzabad and Lucknow of the Gangetic group, and in Peshawur, Nowshera, and Ferozepore of the Punjab group.

Bowel complaints.

The number of cases of dysentery and diarrhœa treated in the Army of India during the year yields an admission-rate of 84 per 1,000 and a death-rate of 1·21; the rates of the previous year were 98 and 0·98. Taking dysentery alone, the admission-rates of the Agra and Central

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India group of stations (19·6), and that of the Punjab (20), were the lowest, the rate of the Burma and Pegu group (1·5) the highest.

Hepatitis. Hepatitis contributed 49 admissions per 1,000 of strength to the admission-rate of the Army of India. In the Madras Presidency 63 cases per 1,000 of strength were admitted; the liability of the European soldiers to this disease is greatest in Burma, least in the Punjab, the admission-rates from this cause in those provinces for the year being respectively 67 and 38 per 1,000. Next to Burma, the Gangetic provinces of the Bengal Presidency shew the highest admission-rate from this cause, *viz.*, 60 per 1,000. The death-rate, however, from hepatitis was not so high in this group as in Meerut and Rohilkund.

Delirium tremens. Of 189 soldiers admitted into hospital for delirium tremens during the year, six died. Compared with the previous year, the number of cases was less by 12, and the deaths by two.

Drunkenness. The number of cases of drunkenness reported among British soldiers in the Bengal Presidency in 1876 was 7,136; in 1875 it was 8,926; in 1874, 10,988. The returns therefore show a reduction in this evidence of intemperate habits to the extent of 35 per cent. in two years. According to the same returns, however, the number of total abstainers had fallen from 3,097 in 1875 to 2,479 in 1876—a decrease of 20 per cent. The returns from Madras give 4,993 as the number of cases of drunkenness reported during 1876: the number for 1875 was 4,683, showing an increase of drunkenness in 1876 to the extent of 310 cases. The number of total abstainers had increased from 612 in 1875 to 862 in 1876—an increase of over 40 per cent. In Bombay there was a slight decrease in the frequency of drunkenness in 1876, compared with 1875, the numbers being respectively 4,065 and 4,259. The number of total abstainers had risen from 794 to 972—an increase of 22 per cent. The returns from which these data are taken cannot be altogether depended on, but it may, perhaps, be assumed that drunkenness among the British soldiers is, on the whole, decreasing.

Venereal diseases. The comparative prevalence of venereal diseases is shown in the following statement:—

Admissions from Venereal diseases.

Year.	Admissions per 1,000.			
	Bengal.	Madras.	Bombay.	India.
1871	208	180	174	196
1872	190	164	154	179
1873	167	152	181	166
1874	200	188	170	192
1875	212	208	174	205
1876	195	184	179	190

The admission-rates of the Army of India and of Bengal and Madras taken separately for 1876 are lower than those of the previous two years, but higher than the rates of 1873 and 1872. The admission-rate of Bombay, though below the rate of the whole Army, is higher than the Presidency rate of any preceding year, with the exception of 1873. Only seven stations in the Bengal Presidency, two in Bombay, and two in Madras, shew admission-rates from venereal diseases below 100 per 1,000. Excluding small bodies of men, the hill stations of Cherat and Ranikhet, the stationary camp at Murree, and the station of Rawul Pindee are the stations of the Bengal Presidency in which cases of this class of disease were comparatively few. At all these stations the admission-rate was below 100 per 1,000. The station of Benares, on the other hand, shews the excessive admission-rate from venereal diseases of 593 per 1,000. In the Bombay Presidency, Kurrachee of the larger stations shews the lowest admission-rate (80 per 1,000), Baroda (327) and Belgaum (240) the highest rates. In Madras, Cannanore and Bangalore shew the comparatively low rates of 101 and 104 per 1,000; Bellary and Kamptee the high rates of 290 and 294 per 1,000.

But although the statistics of the year shew no satisfactory diminution in the prevalence of venereal diseases of all kinds, there were, on the whole, fewer cases of syphilis, the most important of the diseases of this class. In Bengal the cases of primary syphilis admitted for treatment fell from 71 per 1,000, the rate for 1875, to 60 per 1,000; and in Madras also there was a diminution of nearly 10 per 1,000. In Bombay, on the other hand, there was an increase of over 10 per 1,000 in the ratio of cases of primary syphilis. The admissions from syphilis in the Bombay Army did not, however, exceed the Bengal and Madras rates. Compared with 1875, the prevalence of secondary syphilis was considerably less in 1876 in the Madras Presidency, nearly the same in Bengal, but somewhat in excess in Bombay.

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Towards the close of 1876 each Local Government was asked to submit a review of the working of the lock hospitals within its province, and the general result of the inquiry has been to show that the chief obstacle to the greater efficiency of the lock hospital system is the difficulty of controlling unlicensed prostitution; certain measures have been recommended with the view of overcoming this difficulty. Working of lock hospitals.

The loss by invaliding in the Army of India for 1876 amounted to 38·90 per 1,000. This was somewhat less than the loss from the same cause in 1875, or indeed in any of the five previous years. The following table will show how much of this loss was due to invaliding for change of climate, and how much for discharge, and also in what respect the results of 1876 differed from those of former years:— Invaliding.

Invaliding in Army of India.

Year.	Total number invalided.	Ratio per 1,000.	Details of Total.			
			Number sent home for change.	Ratio per 1,000.	Number sent home for discharge.	Ratio per 1,000.
1871	2,381	43·62	1,692	31·00	689	12·62
1872	2,438	43·21	1,731	30·73	707	12·48
1873	2,434	44·58	1,839	33·68	595	10·90
1874	2,411	43·78	1,795	32·59	616	11·19
1875	2,371	40·25	1,837	31·19	534	9·07
1876	2,276	38·90	1,736	29·67	540	9·23

The number sent home for change was less in proportion than the number invalided on this account in 1875, or in any of the three previous years. The number invalided for discharge was slightly in excess of the number of 1875, but considerably below that of the five previous years.

In Bengal the results are satisfactory under both heads. Fewer men were sent home for change, and fewer for discharge. In Madras the number sent home for change in 1876 was considerably less than in the previous year, but the number for discharge was greater. In Bombay the results were not satisfactory. The number sent home for change was higher than in any of the previous five years; so also the number sent home for discharge was higher than in any of five previous years, with the exception of 1871.

The main causes assigned for invaliding rank in the following order:—

1. General debility	8·99 per 1,000
2. Hepatitis	6·10 „
3. Diseases of the heart and large blood-vessels	3·85 „
4. Phthisis pulmonalis	3·18 „
5. Dysentery and diarrhœa	2·41 „
6. Rheumatism	2·07 „
7. Fevers	1·97 „
8. Secondary syphilis	1·69 „
	30·26
of the total of	38·90

These and other causes, however, affected the results in each Presidency in very different degrees. Fever, for example, is assigned as the cause of invaliding in the proportion of 3·68 per 1,000 of strength in Bombay, and only 0·81 in Madras. Dysentery and diarrhœa caused 5·20 per 1,000 to be sent home from Madras, 2·62 from Bombay, and only 1·51 from Bengal. Secondary syphilis was a cause of invaliding to the extent of 3·20 per 1,000 in Bombay, 2·60 in Madras, and only 1 per 1,000 in Bengal.

The total loss due to death and invaliding in the three Presidencies, separately and in the Army of India as a whole, are as follows:—

1876.	Per 1,000. of average Strength.		
	Died.	Invalided.	Total.
Bengal	16·02	35·89	51·91
Madras	15·77	41·51	57·28
Bombay	12·30	46·89	59·19
India	15·32	38·90	54·22

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The Army of Bombay, as in the previous year, shows the highest loss. In 1875 this resulted from its high death-rate; in 1876 it was due to a high rate of invaliding. The total loss to the whole Army of India by death and invaliding was 57·73 per 1,000 in 1875; the rate for 1876 is more favourable by 3·51 per 1,000.

The total loss for 1876 by death and discharge, taking into account the information received as to the ultimate disposal of invalids, was as follows:—

Average Indian strength	57,858
Deaths in India	886
„ on the voyage	19
„ at Netley	24
Total deaths	929
Deaths per 1,000	16·0
Discharged invalids	1,261
Per 1,000	21·8
Total loss by death and invaliding	37·8
The corresponding ratio for 1875 was	31·7

the excess in 1876 being due to the final discharge of 482 more invalids.

Relation of mortality to age.

The following statement exhibits the ratio of mortality among the European troops at different periods of life:—

Causes of Death.	Deaths per 1,000 of Strength.			
	Under 20.	20 to 24.	25 to 29.	30 and upwards.
Cholera	1·69	2·06	2·31	2·55
Remittent and continued fevers	—	·39	·53	·85
Enteric fever	3·38	3·74	1·47	·30
Apoplexy	·84	·67	·84	3·25
Delirium tremens	—	—	·16	·15
Dysentery and diarrhœa	—	·56	1·68	1·40
Hepatitis	—	·89	1·57	2·55
Phthisis pulmonalis	—	·89	·89	1·45
Heart disease	—	·22	·63	2·20
All other causes	·84	2·12	3·78	5·65
All causes	6·75	11·54	13·86	20·35
All causes, excluding cholera	5·06	9·48	11·55	17·80

Enteric fever in India, as elsewhere, falls with the greatest frequency on young persons under the age of 25. In 1876 the greatest number of deaths from this cause occurred to young men between 20 and 25. The liability to all other diseases increases as age advances, and the increase is most marked after the age of 40.

Sickness and mortality of women.

The statistics of the women of European regiments throughout India are favourable, compared with the results of the previous year.

The deaths from all causes were in the ratio of 20·83 per 1,000. Of this, 2·98 per 1,000 was caused by cholera; deducting the deaths from this cause there would remain a death-rate from ordinary causes of 17·85, which is below the rate of every one of the five previous years. The death-rate from cholera among the women exceeded that of the Army of India. The greatest mortality in any one station occurred in Secunderabad, where there were eight deaths from this cause from an average strength of 288 women, equal to 28 per 1,000. Next to cholera the greatest number of deaths, equal to 2·64 per 1,000, was under child-birth. Dysentery contributed 2·15 per 1,000 to the death-rate.

Sickness and mortality of children.

The children of the Army of India in 1876 died at the rate of 55·88 per 1,000; deducting the deaths from cholera, the rate of mortality was less than in any one of the five previous years.

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The death-rate from cholera, compared with that of the men and women, was low. No child under one year of age died of cholera. Diarrhœa contributed to the death-rate in the proportion of nearly one-fifth. Convulsions and dentition contributed in not much lower proportion: children under one year of age died at the rate of 215 per 1,000. The rate of mortality during the second year of life was 90 per 1,000, and during the third year 49. Among children between the ages of 7 and 16 the death-rate was 6 per 1,000.

Mortality of officers.

Of a total of 1,737 officers of the British Army 27 died during the year, equal to 15·5 per 1,000; while of 1,372 officers of the Indian Army 19 died, giving a ratio of 13·90 per 1,000.

Native Troops (Bengal).

Sickness and mortality in Bengal Native Army.

In the Regular Native Army the deaths, including those which occurred on leave as well as those in the regimental hospitals, equalled 15·52 per 1,000. In 1875 the ratio was 15·70, the mortality in both years having been much below the average. The death-rate of the Central India Irregular Force for the year was 9·32, and that of the Punjab Frontier Force 14·69, both rates being below that of the Regular Army. The causes of death in cases of men dying when on leave not being recorded, such deaths are not included in the tables which give the details of deaths occurring with regiments.

The admission-rate of the Regular Native Army for 1876 (14·15) was considerably higher than the rate for 1875 (12·33), and also slightly above the average rate of the ten years 1864 to 1873 (13·91) This increase in the admission-rate resulted solely from the greater prevalence of intermittent fevers. The death-rate was not affected by the greater prevalence of this cause of sickness, and was, in fact, lower than in the preceding year, the rates of the two years being 13·55 and 11·29. The Central India Irregular Regiments and the Punjab Frontier Field Force had also less mortality in 1876, the death-rate of the Frontier Force being 6·3, and that of the Central India Force 1·5, below the respective rates of the previous year.

The extent to which the ten chief forms of sickness contributed to make up the admission-rates of the different sections of the Native Army of this Presidency are shewn in the following statement:—

Diseases.	Admissions per 1,000 of Average Strength.			
	Regular Native Army.	Punjab Frontier Field Force.	Central India Regiments.	Madras Regiments serving in Bengal.
1. Fevers	820	882	302	548
2. Wounds and accidents	130	125	80	61
3. Abscess and ulcer	81	115	88	53
4. Dysentery	71	75	33	19
5. Rheumatism	54	65	52	42
6. Respiratory diseases	54	69	43	33
7. Diarrhœa	35	38	20	12
8. Eye diseases	24	27	66	46
9. Venereal diseases	30	21	23	15
10. Spleen disease	10	14	5	2
Total due to these ten causes	1,309	1,431	712	831
Total from all causes	1,415	1,560	867	927

In all the sections the first nine diseases were the chief causes of admissions into hospital, but in the Madras regiments small-pox would take the tenth place, instead of spleen disease. The ratios of the Central India Regiments and of the Madras Regiments (which also chiefly occupy stations on the highlands of Central India) compare favourably with those of the other two divisions: the admissions from diseases of the eye among these regiments were, however, more numerous. The ratios of the Punjab Frontier Force in respect of all the causes of admission given in the above statement, with the exception of eye diseases, venereal, wounds and accidents, exceeded the ratios of the other divisions of the Native Army.

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The ten principal causes of mortality stand in the following order :—

Diseases.	Deaths per 1,000 of Average Strength.			
	Regular Native Army.	Punjab Frontier Field Force.	Central India Regiments.	Madras Regiments serving in Bengal.
1. Respiratory diseases	2·30	3·23	3·32	3·10
2. Fevers	2·10	2·84	1·33	2·82
3. Cholera	1·85	2·84	·22	·56
4. Dysentery	·86	·88	·66	·28
5. Phthisis pulmonalis	·91	·20	·44	·56
6. Atrophy and anæmia	·66	·49	·66	·28
7. Diarrhœa	·61	·20	·44	—
8. Apoplexy	·18	·20	·22	·56
9. Wounds and accidents	·05	·20	—	—
10. Spleen disease	·25	·10	—	—
Total due to these ten causes	9·77	11·18	7·29	8·16
Total due to all causes	11·29	13·05	8·84	9·57

The causes are the same as those which chiefly contributed to the mortality among the Native troops in 1875.

The Gangetic provinces show the lowest sick and admission-rates, but the Agra and Central India group shows the lowest death-rate (5·02). The admission-rate of the Punjab was the highest; the Bengal and Assam group yields the highest sick and death-rates.

Taking the Regular Army occupying stations in all parts of India, May, June, and July constituted the period of least sickness. In each of these months the sick-rate of the Regular Army was below 30 per 1,000. In October, the month of greatest sickness, the rate was over 60 per 1,000. In Bengal proper, April was the healthiest month; in the Gangetic provinces, June and July; in the Rohilkund and Agra groups, July. On the whole, July, the first month of the monsoon, was the healthiest month; September and October, on the other hand, were, on the whole, the most unhealthy. In Bengal proper, in Agra and Central India, and in the Punjab, the season of greatest sickness included November. In the Regular Native Army deaths (exclusive of deaths from cholera) were least numerous in July, August, and September (the monsoon months); most numerous in January, October, November, and December.

Fevers. Fevers occupy the first place among the causes of admission into hospital in all parts of India. They are classed under two heads, "intermittent" and "remittent and continued," only 15 cases from the whole Native Army of the Presidency being entered as "enteric."

In 1875 the prevalence of fevers was below the average of former years in the Regular Native Army and Central India Regiments, but slightly above the average in the Punjab Frontier Force. In 1876 we find the prevalence considerably above the average in the Regular Native Army, but slightly below it (the years 1874 and 1875 being included in the average) in the Punjab Frontier Force. The Central India Regiments again, as in 1875, show a comparatively low fever rate. Fevers were more prevalent in 1876, compared with 1875, in all the groups of stations occupied by the Regular Native Army. This increase was very marked in Bengal proper, but it was greatest among the regiments quartered in the Punjab. Of the stations in Bengal proper and Assam, fevers were most prevalent in Dum-Dum, Barrackpore, Cachar, and Gowhatty. Of the Meerut and Rohilkund group, Delhi shows the highest fever rate; but the fever rate of Meerut for 1876 was just double that of the previous year, and the increase of prevalence at Moradabad was still greater. In the Punjab group, Ferozepore and Mooltan yield higher fever rates than any other stations in the whole Presidency; and the rates of Jullundur and Meean Meer also are excessively high. Of the frontier stations, Kohat and Bannu show considerably lower rates than in 1875; but at the other stations of this group, with the exception of Murdan, fever was more prevalent in 1876. Notwithstanding the generally greater prevalence of fever in 1876, the death-rate from this cause was less than in 1875, the ratios of the two years being respectively 2·10 and 2·56 per 1,000. The ratio of deaths from fever (2·94) was highest in Bengal and Assam, where it slightly exceeded the ratio of the previous year (2·89).

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Cholera contributed 3 per 1,000 to the admission-rate of the Regular Army, and 1·85 to the death-rate. The corresponding ratios of the Punjab Frontier Force were 5·4 and 2·84 per 1,000. The Native troops stationed at Dacca and Shillong, of the Bengal and Assam group of stations, at Dinapore, of the Gangetic group, at the hill stations of Almorah and Murree, and at the trans-Indus stations of Bannu and Peshawur, suffered more or less severely from the epidemic. The Native troops also that formed Major Sandeman's escort, when *en route* to Khelat by way of the Bolan Pass in April, suffered severely. Cholera.

Dysentery contributed less than 1 per 1,000 to the mortality of the whole Native Army of the Presidency; but in Bengal proper and Assam the ratio of deaths from this cause was over 2 per 1,000. The stations of this group that contributed to the death-rate from dysentery were Alipore, Barrackpore, Dacca, Gowhatty, Fort William, and Cachar. Dysentery.

Diseases of the respiratory organs, as in former years, occupy the highest place in the statement of causes of mortality among the Native troops. The mortality from this cause was greater than in the preceding year among the regiments quartered in Bengal and Assam and in the Gangetic provinces, but less in all the other groups of stations, notably so in the Punjab, and among the regiments of the Frontier Field Force. The epidemic prevalence of pneumonia, from which the Punjab regiments suffered in the early months of 1875, did not recur in 1876. Respiratory diseases.

Jails (Bengal).

The average number of prisoners confined in the jails of the Bengal Presidency during 1876 was somewhat less than the numbers of 1875 and 1874, but considerably above the average of the ten years 1864 to 1873. The following figures give the results of 1876 compared with those of 1875 and 1874 and the ten-year average:— Sickness and mortality in jails.

Period.	Average annual strength.	Sickness per 1,000.		Deaths per 1,000.	
		Admissions.	Daily sick.	Cholera.	All causes.
1864–73 - - - - -	58,232	1,050	32	5·24	46·09
1874 - - - - -	72,060	1,027	34	2·48	39·90
1875 - - - - -	71,414	942	31	2·35	33·65
1876 - - - - -	69,771	1,017	33	4·24	37·51

The admission-rate and death-rate of 1876 were in excess of the rates for 1875, but they were below the rates of 1874 and the ten-year average rates.

The ten forms of sickness which chiefly contributed to the admissions into hospital, as compared with 1875, stand as follows:—

Diseases.	Admissions per 1,000 of Average Strength.	
	1875.	1876.
1. Fevers - - - -	398	457
2. Abscess and ulcer - - -	99	115
3. Dysentery - - - -	95	104
4. Diarrhœa - - - -	90	86
5. Respiratory diseases - - -	37	41
6. Wounds and accidents - -	42	38
7. Atrophy and anæmia - - -	16	19
8. Rheumatism - - -	16	17
9. Venereal diseases - - -	20	11
10. Eye diseases - - -	11	11
Total -	824	899
Total admission-rate for the year -	942	1,017

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Under all the more important heads the ratios of 1876 are above those of 1875, but the excess is in no case great. The chief causes of mortality appear in the following order:—

Diseases.	Deaths per 1,000 of Average Strength.	
	1875.	1876.
1. Dysentery and diarrhœa - -	12·38	14·75
2. Respiratory diseases - - -	5·01	5·45
3. Cholera - - - -	2·35	4·24
4. Phthisis pulmonalis - - -	1·86	3·24
5. Fevers - - - -	4·20	2·36
6. Atrophy and anæmia - -	1·65	2·19
7. Dropsy - - - -	·67	·73
8. Apoplexy - - - -	·52	·59
9. Wounds and accidents - -	·62	·52
10. Spleen disease - - -	·77	·29
Total -	30·03	34·36
Total annual death-rate -	33·65	37·51

There was greater mortality in 1876 compared with 1875 from dysentery and cholera, and the rates of mortality from phthisis and atrophy and anæmia for 1876 were nearly double the rates from those causes in 1875.

Results in different provinces.

The following figures show the average admission and death-rates of the jails of the different provinces for the ten years 1867—1876, compared with the rates for the year under review:—

	Admission-rate.		Death-rate.	
	1867-76.	1876.	1867-76.	1876.
Bengal, including Assam - - - - - - -	1,240	1,236	52·31	58·89
Oude - - - - - - - - - - -	572	507	22·11	13·12
North-West Provinces - - - - - -	751	583	35·41	24·94
Punjab - - - - - - - - - -	1,151	1,677	32·27	36·65
Central Provinces - - - - - - - - -	1,305	939	38·88	40·16

It will be observed that the Bengal jails yield the highest average admission-rate, with the exception of the Central Provinces, and the highest death-rate; the Oude jails, the lowest admission and death-rates. The insanitary conditions, both local and personal, which contribute to the excessive mortality among the prisoners appear to be more general and constant in the densely-populated districts of Bengal; and it is in the jails of this province that we meet with the greatest sickness and mortality. The admission-rate of the Punjab for 1876 was much above the average; that of Bengal about equal; while the admission-rates of the jails of the other three provinces were much below their averages. The death-rates of the jails of Bengal, the Central Provinces, and the Punjab for 1876 were above the average of the ten years. The death-rates of the jails of Oude and the North-West Provinces were much below the average. February was the month of least sickness, while August, September, and October formed the period during which the causes of sickness were most widely prevalent; and in this respect the variations exhibited by the different groups of jails are slight. In the Bengal jails the daily sick and admission-rates were lowest in December, and the admission-rate was highest in July. The daily sick-rate, however, was at its maximum in September. In the Oude jails the daily sick-rate was comparatively low in September and high in November.

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The sudden rise in the admission-rate of the Punjab jails from 105 for July to 213 for August, and again the fall from 233, the rate for October, to 160, the rate for November, mark very clearly the period of the seasonal exacerbation of the prevalence of fever in that province.

Cholera forms an important component of the admission and death-rates of the Bengal jails only. Of the 47 jails under the administration of Bengal, only 11 escaped cholera. In many, notably the Pubna, Julpigoree, Hazareebagh, Ranchee, Chumparun, and Chupra jails, the mortality from the epidemic was very great. In the Oude jails no case of cholera occurred. The 39 jails of the North-West Provinces experienced a like immunity, with the exception of one case at Mirzapur and one at Agra. This remarkable immunity from cholera of the jails of Oude and the North-West Provinces in contrast with those of Bengal was not due to the absence of the epidemic from the districts, for it was generally prevalent over both provinces, and in several of the Oude districts and of the eastern districts of the North-West Provinces it caused greater mortality than in the Bengal districts, the jails of which suffered so severely. In the jails of the Central Provinces the epidemic appeared in six jails, but in none was there any severe outbreak. The total number of cases amounted to 11, of which 6 were fatal. In the Punjab, cholera attacked 7 jails. The total number of cases amounted to 30, 12 of which occurred in the small jail of Shahpur.

The Punjab jails show the highest death-rate from fever. Dysentery and diarrhœa were the chief causes of mortality in all the provinces, but the greatest mortality from these affections occurred in Bengal. Deaths from respiratory diseases occurred in the greatest proportion in the Punjab jails, but the death-rate from this cause was also high in the jails of the Central Provinces. In Bengal phthisis pulmonalis contributed nearly 7 per 1,000 to the death-rate. In the other provinces the deaths from this cause ranged from 1·26 per 1,000 in the Punjab to 1·87 in Oude. Atrophy and anæmia form together an appreciable component of the death-rate of the jails in all the provinces; in the Central Provinces the deaths accounted for under this head amounted to 5 per 1,000 of the average strength, and in the Bengal jails to 3 per 1,000.

Comparison with other bodies of people.

Compared with the Native troops of the Regular Army, we find the mortality among the prisoners 2½ times greater; and the chief causes of mortality differed considerably.

The cholera death-rate of the jails of the Presidency exclusive of those under the Government of Bengal was only 0·46 per 1,000. That of the Regular Native Army was 1·85. The fever death-rate of the prisoners was very little in excess of the rate for the Regular Army. Dysentery and diarrhœa, diseases of the respiratory organs, phthisis pulmonalis, and atrophy and anæmia, are the diseases which contribute chiefly to raise the mortality among the convicts above that of the sepoys—diseases which are more especially attendant upon poverty and low conditions of life. We find, moreover, that in almost all the jails which exhibit high rates of mortality these diseases are the chief components of the death-rate; and that in nearly all these jails the majority of the prisoners who died had been in indifferent health when imprisoned.

It is remarkable that among the prisoners as well as among the troops, European and Native, although fevers were more prevalent than in 1875, the death-rate from this cause was considerably lower; this lower death-rate occurring with an equal or greater prevalence of fever is observable with respect to both Native troops and prisoners in nearly all the groups of stations, but it is most remarkable in the Rohilkund and Punjab groups. Among the Native troops stationed in Rohilkund and Meerut the admission-rate from fevers for 1875 was 324 per 1,000, for 1876 it was 510; the death-rate from the same cause was 2·48 for 1875, 1·79 for 1876. In the Punjab the admission-rate of the Native troops was 800 for 1875, 1,174 for 1876; the death-rate in 1875 was 3·26, in 1876, 2·25. In the Rohilkund and Meerut jails the admission-rate from fever in 1875 was 270 per 1,000, the death-rate 6·33. In 1876 the admission-rate was 255, the death-rate 1·69. In the Punjab Jails the admission-rate from fever for 1875 was 708 per 1,000, the death-rate 7·53; while for 1876 the corresponding rates were 1,108 and 5·41.

In the jails of the Central Provinces the fever admission-rate was in both years 350 per 1,000; in 1875 the death-rate was 2·47 per 1,000; in 1876 it was only ·80. The diminished rate of mortality from spleen disease both among the troops and the prisoners may also be taken as evidence that the type of the prevailing fever was less severe in 1876. The deaths from spleen disease among the troops in 1875 equalled ·56, and among the prisoners ·77, per 1000; for 1876 the ratios were respectively ·25 and ·29 per 1·000.

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In the absence of accurate mortuary statistics of the general population, we have no criterion by which we can judge how far the high rate of mortality in many of the jails is attributable to causes acting on the population from which the prisoners are drawn, and how far it may be the result of insanitary conditions within the jails themselves; and this is especially the case with regard to the province of Bengal, where the mortuary statistics are less advanced towards accuracy than in the other provinces. The statistics of nearly all the provinces are, however, improving, and every year they afford additional evidence that the rate of mortality among the general population of this country is very high compared with the rates that prevail in European countries, and that it is subject to much greater fluctuations; that, in fact, the people of this country live surrounded by insanitary conditions, the malefic action of which bears a certain relation to atmospheric changes, and is consequently rendered more intense in some years than in others. There is, moreover, little room for doubt that with a large portion of the population the means of subsistence are very precarious; that at all times the number of people reduced to a low degree of vitality by poverty and insufficient or innutritious food is very large. Any increase in the price of food adds largely to the number of this class, and any sudden or abnormal atmospheric change greatly increases the mortality among them. It is of this class that the population of the jails is chiefly constituted, and we consequently find that the diseases attendant on poverty and insufficient food contribute in large proportion to the death-rate of the jails.

As the mortuary statistics of the general population include the infant mortality, which is very high, they are not strictly comparable with the jail statistics. On the other hand, when it is considered that the convicts are chiefly drawn from the lowest and poorest classes, who, being badly housed, badly clothed, and badly fed, suffer more from the effects of malaria and atmospheric changes, and therefore contribute chiefly to the increase of mortality that occurs in unhealthy seasons, it must, I think, be allowed that a jail death-rate much below the rate of the neighbouring town or district may be accepted as evidence that the chances of life among the prisoners have been for the time better than those of the population outside, and this was the case with respect to the majority of the jails in 1876. The comparative statistics of the central and district jails also point in the same direction.

Of 43 jails under the Government of Bengal, containing over 100 prisoners, only 4, and of 9 jails under the administration of Assam only 2, show death-rates under 20 per 1,000.

The deaths registered in 29 towns of the province of Oude in 1876 yield a mean death-rate of 29·27 per 1,000. The mean death-rate of the 13 jails in the province for the year was 13·12.

The number of deaths registered in 81 towns of the North-West Provinces yielded a mean death-rate of 32·5 per 1,000; the mean death-rate of the 39 jails of the province was 24·94 per 1,000.

In the Punjab the death-rates ranged from *nil* at Gurgaon to 89 per 1,000 at Umritsur the mean being 36 per 1,000. The site of the latter jail appears to be unhealthy; the building lies in about the lowest part of the country; it is most difficult to drain, and the subsoil water is near the surface; moreover, a neighbouring jheel, when full, flows back along the jail drainage ditch. The most remarkable feature in the statistics of the Punjab jails is the excessive admission-rate from fever in many of them. The mean death-rate of 208 towns in this province was 46 per 1,000.

The mean death-rate of the 19 jails of the Central Provinces was 40 per 1,000, as compared with 52 per 1,000 in 72 towns. Considering that cholera prevailed with great severity in many of the sudder towns, the freedom of the jails from epidemic outbreaks is worthy of note. In no jail did the number of cases of cholera exceed 3. The towns of Hoshungabad, Nursingpur, and Jubbulpore suffered very severely from the epidemic, but the jails escaped altogether.

Comparison of central and district jails.

The following statement exhibits the sickness and mortality of certain central jails compared with that of the district jails in the same localities. The district jails contain convicts belonging to the several districts sentenced to short terms of imprisonment, while the central jails contain convicts sentenced to long terms, and the majority have been drafted from the jails of other districts. Great sickness and mortality among the prisoners in the district jail would commonly be attributable to causes acting on the general population, while great sickness and mortality in the central jail in excess of that in the district jail would to a great extent indicate the existence within the jail of local causes prejudicial to the health of the prisoners. Two of the jails shewn in the statement belong to Bengal, the others to the North-West Provinces. In the Central Provinces and the Punjab the central jails are also

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district jails, and do not therefore afford the same means of comparison:—

Jails.	Ratio per 1,000.	
	Admissions.	Deaths.
Midnapore Central	1,243	31·94
Ditto District	1,868	87·80
Bhaugulpore Central	1,049	39·06
Ditto District	645	35·09
Benares Central	714	18·97
Ditto District	990	29·75
Lucknow Central	262	9·81
Ditto District	488	18·18
Futtegurh Central	1,033	9·43
Ditto District	551	32·42
Allahabad Central	181	12·27
Ditto District	252	20·71
Agra Central	525	22·01
Do. District	505	18·18
Bareilly Central	280	20·30
Ditto District	526	12·33
Meerut Central	631	100·16
Ditto District	1,606	64·90

On the whole, the statistics of the central are much more favourable than those of the district jails.

Effect of imprisonment on health.

From the following table, which gives the mean mortality among prisoners in the jails of the different provinces according to the length of imprisonment for the year 1875, it appears that the rate of mortality is generally high even during the first six months of imprisonment:—

Mortality according to length of imprisonment.

Province.	Deaths per 1,000 of average Strength.					
	Under 6 months.	6–12 months.	1–2 years.	2–3 years.	Above 3 years.	All terms.
Bengal	32·8	45·6	76·9	51·6	58·7	50·4
Oude	14·1	13·7	17·4	12·6	11·4	14·0
North-West Provinces	31·9	32·6	26·5	18·5	17·1	27·1
Punjab	22·3	32·8	30·6	30·2	45·6	31·9
Central Provinces	27·2	50·5	23·9	30·9	35·9	33·0
Mean	27·55	34·73	38·22	29·80	40·83	33·60

Read with the knowledge of the nature of the diseases from which the prisoners chiefly die, the above table confirms the statements generally made by medical officers that a large proportion of the convicts are in bad health when they come into jail; and, although with the care and treatment they then receive many may recover, a considerable number are past recovery, and do not survive the second year of their imprisonment. On the whole, this review of the statistics of the jails seems to warrant the conclusion that a high rate of mortality in a jail is more often the result of causes prejudicial to health that have been operating on the general population, and to which the prisoners have been subjected prior to incarceration, than to insanitary or other causes existing within the jails.

In a large proportion of the jails under the Government of Bengal the prisoners are still liable to epidemic outbreaks of cholera, and this fact must be regarded as an indication that the insanitary condition which predisposes to this disease continues to exist in them; but from the jails of all the other provinces this condition, whatever it may be, has been very generally removed, and though a high rate of mortality, persistent through a series of years, in a few of the jails of the North-West Provinces indicates the existence in them of other local insanitary conditions, there is little room for doubt that, on the whole, a man's chances of life are improved when he gains admission into jail; he is better housed, better clothed, and better fed, and is to a great extent removed from epidemic and endemic influences.

A very general belief is indeed gaining ground that the efforts made to improve the standard of health in our jails have been carried too far; that the very much better conditions of life by which the criminal population of jails is surrounded, compared with the classes

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among the general population from which the convicts are chiefly drawn, have diminished the effect of imprisonment in deterring from crime.

It appears that under all the Governments and Administrations of the Bengal Presidency the jail population has greatly increased during the past five years, and that the increase consists in a very large proportion of individuals who, having experienced imprisonment, regain admission into jail by subsequent crime. These facts, taken in connection with the evidence given regarding the condition of a large proportion of the prisoners on admission into jail, the greater sickness and greater mortality among the prisoners who have undergone comparatively short terms of imprisonment, and the nature of the diseases from which they die, appear to me to indicate that, at the best of times, there is in all parts of the country a very large pauper population who have barely the means of existence, and that numbers of these seek refuge from starvation in the jails.

The remedy for this state of things does not seem to me to lie altogether in adding to the severity of punishments, or in reducing the conditions of life within the jail to the level of the pauper population outside. It may be the case in some jails that an undue dread of showing a high annual rate of mortality operates to the extent of rendering the life of the convicts more easy than is consistent with the purpose for which jails are maintained, and this tendency is, perhaps, increased by the disposition to hold the medical officer responsible for a high death-rate within the jail under his charge, when it may be the results of causes over which he has no control; but it must be borne in mind that bodies of men collected together in confinement in this country need very careful management, and this is more especially the case when a considerable proportion of the individuals composing them are in a low state of vitality; and that to attempt to maintain bodies of men so composed under the same low conditions to which they have been living prior to imprisonment would be to invite outbreaks of epidemic fever to which such bodies are peculiarly liable. A medical officer receiving under his charge an individual in a low state of vitality, who he knows from experience will (unless his condition be improved) contribute to swell the rate of mortality before the time for which he has been imprisoned will expire, must take the most efficient means at his disposal for obviating such a termination, whether it be by giving better food, or better clothing, or by mitigation of labour. The difficulty might perhaps be met, and the conditions of imprisonment made more severe and deterrent, were it possible first to eliminate to some extent the pauper element which at present enters so largely into the composition of the jail population, by providing some other refuge than the jail for the many among the general population who are but little removed from starvation.

General Population.

Vital statistics.

The general results of the mortuary statistics that have been received are as follows:—

	Deaths per 1,000 of Population.
Bengal proper	16·40
Oude	18·21
North-West Provinces	23·39
Punjab	28·
Central Provinces	30·38
Berar	31·9
British Burma	14·79
Assam	9·33
Madras	23·34
Bombay	21·81

The great variations in the death-rates apparent in this table show that the registration of deaths continues very defective in nearly all the provinces. The Punjab, the Central Provinces, and Berar show provincial death-rates which are high compared with the rates that prevail in European countries; but even in those provinces the great variations in the district rates give evidence of imperfect registration, and it is probable that even the highest district rates given in the table are below the truth. Progress towards greater accuracy is, however, generally observable, and the statistics of several of the provinces now furnish fair data for estimating the fluctuations in the health of the people. Compared with the previous year, the statistics of Bengal collected from the whole population show considerable improvement, the death-rate having risen from 10 to 16·4 per 1,000. The death-rate of the selected areas of the province was below that of the previous year. It has now been decided that the attempts to collect more accurate statistics from selected areas shall be abandoned, and that efforts shall be made to improve the registration of deaths generally over the province. In Assam also the system of collecting statistics from selected areas appears to have been given up, and the registration of deaths generally over the province to have been undertaken.

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The results for 1876 were very small. In the report for last year the very backward state of registration in Oude and British Burma was noticed. The statements that have been received from those provinces for 1876 show that progress was made during the year in Oude, especially in the statistics of the towns. In Burma no advance appears to have been made.

In all the provinces the town rates are in excess, and in all, with the exception of Berar, the difference is very great. The registration of deaths is no doubt more defective in the rural tracts, and the town death-rates represent more nearly the actual mortality among the general population. The towns of the Central Provinces and the Punjab yield the highest death-rates; the mean death-rate of 72 towns in the former being 52, and of 208 towns in the latter 46. In the Central Provinces 14 towns showed death-rates ranging between 50 and 87 per 1,000. In most of these cholera contributed largely to the death-rate. In the Punjab 48 towns showed death-rates ranging between 50 and 100 per 1,000, and in eight the rate was above 100 per 1,000. February is, on the whole, the healthiest month. In this month the effects of the fever of the autumn months and the respiratory diseases of the cold weather of January and December have almost ceased, while cholera and the fevers of the hot weather attain to no great degree of prevalence over the greater part of India till the months of April and May. In the Punjab, where the weather continued unusually cold in 1876 through February and March, the mortality did not fall to its minimum till April. In the Madras Presidency the seasons differ from those of other parts of India; cholera was very prevalent throughout the year, and was the cause of more than a fifth of all the deaths registered; the lowest mortality from this cause and from all causes fell in October. In Bengal the maximum mortality was in November, when the storm-wave devastated the districts of Backergunge and Noakolly, and was followed by a terrible outburst of cholera in those districts and the districts adjoining them. In Assam the maximum occurred in April, nearly half the deaths registered being due to cholera. In Oude the greatest number of deaths was registered in June, when cholera attained its maximum of prevalence. In the North-West Provinces September was the month of greatest mortality. Fever had then almost attained to its maximum of prevalence, and cholera, though on the decline, was still epidemic in the Rohilkund districts. In the Punjab the greatest mortality was in October, when fever reached its maximum of prevalence, and the number of deaths registered in that month was more than five times the number registered in April. In the Central Provinces August was the month of greatest mortality; cholera, though it commenced to decline in the middle of the month, continued prevalent to the end, and the mortality from fever and bowel complaints was rapidly increasing. In Berar the greatest mortality fell in September, more than four-fifths of the deaths being registered under fever and bowel complaints.

In Bombay August was the month of greatest mortality. Fever and bowel complaints attained to their maximum of prevalence, and cholera, though rapidly declining, was still prevalent.

In Madras the mortality, though it had fallen to its minimum in October, rose to its maximum in December, more than two-thirds of the deaths registered being due to cholera.

The ratio of deaths ascribed to different causes is shown in the following table:—

Province.	Deaths per 1,000.						
	Cholera.	Small-pox.	Fevers.	Bowel complaints.	Injuries.	All other causes.	All causes.
Bengal—selected areas	3·35	·39	13·09	1·86	·99	3·47	23·15
North-West Provinces	·85	1·14	16·10	2·88	·43	1·96	23·39
Punjab	·33	·59	20·09	1·56	·27	5·57	28·41
Central Provinces	2·71	·51	20·22	2·70	·45	3·78	30·38
Berar	1·2	·2	18·2	7·5	·4	4·4	31·9
Oude	1·84	·47	13·61	·61	·43	1·25	18·21
British Burma	1·28	·46	8·62	1·83	·17	2·40	14·78
Assam	2·26	·38	4·63	1·12	·19	·75	9·33
Madras	5·08	·8	7·8	1·3	·3	7·8	23·3
Bombay	1·90	·70	13·08	1·99	·36	3·78	21·81

In all the provinces fever takes the highest place among the causes of mortality. In the Central Provinces, Oude, and the North-West Provinces the ratio of deaths from this cause is more than two-thirds of the ratio from all causes. In the Punjab it amounts to nearly three-fourths. The mortality from fever in proportion to the mortality from all causes is least in Madras. The mortality from cholera in proportion to the total mortality is highest in Madras and Assam, lowest in the Punjab. The mortality from small-pox was highest in the North-West Provinces; in none of the other provinces did the mortality from this

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cause amount to 1 per 1,000. Berar, as in former years, shows a mortality from bowel complaints much in excess of any other province.

In 1876, as in former years, the rate of mortality among females was generally lower than among males. In the Punjab, however, the death-rate among females was slightly in excess of the male death-rate.

The information regarding deaths at different ages furnished by the statistics of the different provinces is very imperfect. In the Central Provinces and Berar only have deaths hitherto been recorded according to the classification of ages adopted in the census. In the other provinces the deaths have been recorded under the heads of infants, boys, girls, adults, and old people, a classification which, as it does not correspond with the census, is useless for statistical purposes. This defect has been remedied in the new forms for vital statistics lately issued. In the Central Provinces the deaths at different ages per 1,000 living in 1876 and the preceding year were as follows:—

	All ages.	Under 1 year.	1—6.	—12.	—20.	—30.	—40.	—50.	—60.	60 and upwards.
1875 - - - -	26·3	135·6	33·0	12·4	9·1	10·1	14·3	22·7	41·0	134·4
1876 - - - -	30·3	163·4	33·5	12·4	10·6	12·9	17·4	28·3	50·6	165·3

In the Central Provinces the deaths of infants under one year were equal to 27·5 per cent. of the total number of deaths registered. In the North-West Provinces the percentage of the infant mortality on the total mortality was 25 per cent., in the Punjab and Bengal it was 17, in Bombay 18, and in Madras 15. In the Central Provinces the deaths of infants and children under 6 years of age were equal to 46 per cent. of the total mortality. In Berar the percentage was 49·5.

The registration of births is generally more imperfect than the registration of deaths. In Bengal it is carried out in selected areas only, in the North-West Provinces and the Punjab in municipal towns. In Oude it has not been attempted at all. In the Central Provinces, Berar, Burma, Madras, and Bombay, births occurring among the whole population are registered, and it would be better if this course were followed in all provinces.

In all parts of the country the births of males are considerably in excess of the births of females.

On the whole, the provincial reports that have been received show that improvement has taken place in the collection of vital statistics during the year under review, but the advance towards accuracy from year to year is very slow. The statistics now afford us valuable information with respect to the fluctuations in the prevalence of epidemic diseases, and they enable us to some extent to form an estimate as to how far the general causes of mortality have been more or less active in one year than in others that have preceded it, but they scarcely afford us trustworthy information of the extent to which these causes of mortality are more permanent in any given localities than in others, and they do not show with certainty the effects of any sanitary improvements that may have been carried out. They do not enable us to judge even approximately what may be the rate of increase among the population, or the effects of seasons of famine or scarcity, and they do not afford the standard for comparison which is so much required to enable us to estimate how far the high mortality in a large number of jails is the result of causes prejudicial to health acting on the general population or of insanitary causes existing within the jails themselves. The obstacles in the way of improvement in the registration of births and deaths in rural tracts are no doubt great, but with proper arrangement and due enforcement of the bye-laws the work might be performed in all municipal towns with far greater efficacy than is generally the case at present.

Cholera. In 1876 nearly half a million deaths from cholera were recorded, 100,000 more than in 1875, and 400,000 in excess of the number of deaths from the same cause in 1874.

It will be most convenient first to describe the progress of the epidemic in the Madras Presidency.

In January the increase of mortality that had commenced in December in the coast districts continued and was very marked in North and South Arcot, in Tanjore, and in Malabar; and South Kanara, which had previously remained free, was invaded. There were also signs of renewed activity in the districts of Kurnool and Bellary and in the province of Mysore. In February the prevalence of the epidemic declined generally in the coast districts, but there was marked increase in the inland districts of Bellary and Kurnool; and the district of Vizagapatam, which had hitherto been free, was invaded. In March the prevalence of the

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epidemic still further declined in the majority of the districts, and the lowest monthly mortality of the year was attained; in this month the number of deaths registered in the whole Presidency (including Mysore) from cholera had fallen from 16,421, the number of the previous November, to 9,030. In Bellary and Kurnool and in Mysore, however, the epidemic prevalence had increased rapidly. In April this increased epidemic activity extended to Cuddapah, Salem, and others of the inland districts, but in the majority of the coast districts the cholera mortality continued to decline. In May there was for the time a decline of prevalence in Bellary and Kurnool, but increased prevalence in almost all the other districts. In June and July this general prevalence continued to increase, and in the latter month the total number of deaths recorded in the Presidency amounted to 19,702, a number considerably in excess of that of the previous November. The epidemic prevalence had, however, declined in the province of Mysore in July, and this decline of prevalence extended generally over the Presidency in the following month of August, and the total cholera mortality fell to 10,876, or little more than half the number of July. Only the districts of Nellore and Tinnevelly and the town of Madras failed to experience this diminution of the epidemic; it was most marked in the Godavery and Kistna districts and in the districts of Kurnool, Bellary, and North and South Arcot. This decline in the prevalence of the epidemic continued through the months of September and October, and the total mortality fell in the latter month to 3,732. In November, however, the statistics again exhibit an increase of prevalence in nearly every district of the Presidency, and the total mortality rose to 8,217. In the month of December the epidemic prevalence became still further intensified, and the total mortality rose to 31,463, just 8½ times the mortality of the previous October. In Nellore the mortality rose from 465 in October to 3,884 in December; in Cuddapah from 540 to 3,777; in Salem from 124 to 3,928; in Bellary from 166 to 2,858, and in Kurnool from 38 to 6,042.

The following may be said to be the main features of the Madras epidemic of 1875–1876. Isolated cases of cholera occurred on the sea-board of Tanjore during the first three months of 1875, and the disease became epidemic in that locality in April. The epidemic spread gradually from thence both along the coast and inland, until in July and August it had attained to more or less prevalence in nearly every district of the Presidency; it continued to prevail through the remaining months of 1875, and through the whole of 1876. During this time the epidemic prevalence exhibited marked fluctuations; in 1875 the maximum prevalence was attained in the districts first attacked in July; August was marked by a decline in these districts, which continued till November; but in the south inland districts the epidemic continued to increase till December, when it declined. In this month, however, an increase of prevalence commenced in the coast districts, and a second maximum was reached in these districts in January. February was marked by a decline of prevalence in the coast districts, and a second minimum was attained in March. An increase of prevalence had, however, commenced in the Deccan and south inland districts, which became general in April and May, and a third maximum was reached in July. From this time the course taken by the epidemic in the previous year was repeated; it declined through August, September, and October, falling to a third minimum in that month, and rose again, but with far more destructive force, in November and December.

In the Nizam's territories cholera was less widely spread in 1876 than in the previous year. In 1875 all the districts to the west of the city of Hyderabad suffered more or less severely, but the prevalence declined in October, and at the close of the year it was present only in the city. It had first appeared in the city in the middle of August 1875, and committed great havoc there in September; it had then declined, and had almost died out in December; but in January it again manifested epidemic activity, and the monthly mortality increased till the month of May, when 1,577 deaths were recorded. In June the number of deaths fell to 1,170, and in July to 291. The returns from the Hyderabad districts are not altogether to be relied on, but it would appear that the epidemic of 1876 did not prevail in them to any great extent. It occasioned some mortality in the Linga Sagar districts in the early months of the year, but no cholera deaths were reported from Raichore or from the districts to the north of the Kistna.

In the Bombay districts of Dharwar, Belgaum, and Kaladgi, which lie to the north of the Toongabudra and Kistna rivers, cholera had prevailed in October 1875, but the prevalence had declined in December. In January, however, the epidemic again became active in these districts, and its prevalence continued to rise till the month of May, when it culminated; then, declining through June and the following months, it fell to a minimum in September. In October it again commenced to rise, and this rise became very evident in December; it was not, however, so marked as the increased activity of the epidemic at the same period in the Deccan districts of the Madras Presidency. In the more northern districts of the Deccan—Sholapur, Satara, and Poona—cholera did not become prevalent till May and June; Ahmed-

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nuggur and Nasik were not affected till July, and Khandesh escaped with only 29 deaths, which were recorded in August, September, and October.

In the maritime or Konkan districts of Bombay the prevalence of cholera was comparatively slight throughout the year. It was present in Kanara and Rutnagherry in the early months of the year, reaching its maximum of prevalence in the former district in the month of April. In Colaba 70 deaths from cholera were recorded in the year, and these occurred in the months of July, August, and September. The district of Tanna had suffered severely in the months of June, July, and August, 1875, and the epidemic prevailed to a less extent during the same months in the city of Bombay. The prevalence declined through the last quarter of the year, but, though it had ceased to be epidemic in January, isolated cases continued to occur through all the early months of 1876, and it again became epidemic in both city and district in the month of June. Cholera had continued prevalent in Surat from June 1875 till the end of the year; the prevalence had fallen to a minimum in January 1876, but in February it again commenced to increase, and continued to rise till the month of May, when it again declined. In the Ahmedabad district of Guzerat cholera had commenced to prevail in May 1875, and reached its maximum of prevalence in the following month; it then declined, and disappeared in September. In January 1876, however, it re-appeared here and in Rajkote; in the end of March and beginning of April it spread to Kaira; the Punch Mehals, Baroda, and Broach became affected in May, and in this month the epidemic reached its greatest prevalence in this part of the Bombay Presidency. Spreading northward from Ahmedabad, the epidemic reached Deesa on the 17th May, and the desert tract of Thur and Parkur on the 23rd. In this district 88 deaths were recorded during the year, and of these 50 occurred in June. In Sind no deaths from cholera were registered during the year, but registration is very imperfect in the border districts, and there is reason to believe that the epidemic, which had reached the Kurrachee district in November 1875, and continued prevalent there in December, subsequently spread thence across the border. The force that formed Major Sandeman's escort to Quetta through the Bolan Pass, and which marched from Jacobabad in the beginning of April, suffered severely from cholera when crossing the Cutchi desert, and on enquiry it was found that the disease had been prevalent among the population for some time previously. It was probably by this route that cholera reached Kandahar, where it broke out with great severity in July. The epidemic of 1876 in the Bombay Presidency fell with great severity on the Southern Mahratta districts, but over the rest of the province the prevalence was light compared with the previous year.

In the Central Provinces the epidemic, which in 1875 had covered a very wide area, declined in the months of September and October, and at the close of the year was present only in the town of Garchiroli in the Chanda district: here it ceased in the last week of January 1876, and for nearly a month no death from cholera was reported from any district of the province. On the 21st February cholera appeared in the Sumbulpur district, south of the Mahanuddee river. On the 22nd March it re-appeared in the Chanda district in the neighbourhood of the town of Garchiroli. On the 11th March an outbreak occurred in the town of Mandla in the Satpura range, and on the 13th of the same month it broke out in the village of Shahpur in the Betul district of the same range.

The appearance of cholera in the Sumbulpur district in February coincided with the return of pilgrims from Pooree, and the first known sufferer was a pilgrim. From this time the epidemic spread in the district, reaching its maximum of prevalence in June: its prevalence was chiefly confined to the part of the districts south and west of the Mahanuddee; the sudder town, which is situated on the eastern bank, was not reached till July. The epidemic spread southward into the Borasambar State in April, and in June and July it became prevalent in the States of Sohnpur, Patna, and Kalahundi, which lie to the south of the Sumbulpur district. Bustar, further to the south, did not suffer, and there is no evidence that the tributary States that lie between Sumbulpur and the maritime districts of Orissa were involved in the epidemic. Spreading westward, the epidemic occasioned some mortality in the States of Phulghar and Saranghur in March, and in the latter end of this month an outbreak occurred in a village of the Raipur district; the epidemic subsequently spread in this direction to two or three other villages to the west of the Upper Mahanuddee, but it attained to no great degree of prevalence.

The outbreak of cholera in the town of Mandla in March was also attributed to importation by pilgrims returning from Pooree. The epidemic did not become very prevalent or continue long in the town, but it spread to several villages in the immediate neighbourhood, and Mandla and these neighbouring villages apparently became a centre whence the disease was carried to one village in the Jubbulpore district, to another in the Balaghat district, and to one in the Seoni district, the last forming a centre whence the epidemic spread over a considerable portion of the district: it did not, however, at any time attain to any great degree of prevalence in either Seoni or Mandla.

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In the Chanda district, the epidemic, subsequently to the first outbreak near Garchiroli in March, spread over the district through the months of April and May, and attained its maximum of prevalence in June, when it declined, and finally ceased in the month of December. The district of Chanda is bordered on the east by zemindary estates, which are chiefly covered by forest and are very sparsely populated. Into these tracts the epidemic did not spread, but it spread southward, along the villages on the banks of the Waingunga and Pranhita rivers as far as the junction of the latter with the Godavery, reaching Sironcha in the month of June. Extending westward from Chanda, the epidemic crossed the Wardha river into the Wun district of Berar in the middle of May, and thence apparently spread westward as far as Buldana, which was reached in July. Spreading northward, it entered the districts of Wardha, Nagpore, and Bhandara in June and July; but neither in Berar, nor in the districts of the Central Provinces east of the Wardha river, did the epidemic attain to any great degree of prevalence. In Berar, in 1875, 22,465 deaths from cholera were recorded; in 1876 the number amounted to 2,683. In Nagpore and Wardha, in 1875, the number of cholera deaths recorded was 4,226; in 1876 it was 1,144. The outbreak which took place in the Betul district in the middle of March apparently formed a centre whence the epidemic spread over a wide area. Spreading southward from Betul, the epidemic descended the hills into the Ellichpur district of Berar, which it reached in the end of April or beginning of May, and subsequently met the epidemic which had spread northward from Chanda.

At the time of the outbreak of cholera in Betul, the hill people were migrating in considerable numbers into the valley of the Nerbudda to assist in the wheat harvest that was then commencing, and they appear to have carried cholera with them, for the first outbreak in the valley occurred in a party of Gonds employed in the harvest near the town of Hoshungabad. Spreading westward from this point, the epidemic reached the district of Nirma in July, and eastward up the Nerbudda Valley the district of Nursingpur was reached in the middle of May, Jubbulpore in the beginning of July, and here this epidemic met the offshoot of the epidemic which had spread southward from Benares and the eastern districts of the North-West Provinces. Crossing the Nerbudda by Hoshungabad and ascending the Vindhya Range, the epidemic of the Nerbudda Valley reached Bhopal in the beginning of May, and thence passed on to Saugor, which was reached by the end of the month; thence in the latter end of June and beginning of July it spread into the Damoh district. This district is bordered by the States of Rewah and Punnah, into which cholera had by this time spread from the eastern districts of the North-West Provinces.

In the Chanda district the maximum mortality was attained in the month of June, the epidemic continued to prevail with considerable force through July and August, but by the end of September it had ceased. Its subsequent re-appearance in November will be explained presently.

In the hill districts of Betul the epidemic attained its first maximum of prevalence in the month of May, it then declined and ceased to prevail for a time in the latter end of June and beginning of July, but with the heavy rains of July it re-appeared and the maximum of prevalence for the year was reached in the middle of August, after which it declined, and finally died out in November.

In the Hoshungabad district of the Nerbudda Valley the epidemic attained its maximum of prevalence in the latter end of May, but the prevalence did not decline till the latter end of June, when the rains set in; after which the decline was rapid and without check till the end of September, when it finally disappeared.

The epidemic did not reach the adjoining district of Nursingpur till the middle of May, two months subsequent to its appearance in Hoshungabad; and the maximum of prevalence was not attained till July, more than a month later than in Hoshungabad; its cessation was, however, simultaneous in both districts. In the Saugor district of the Vindhyas the first appearance of the epidemic took place a fortnight later than in Nursingpur; the rise in prevalence was comparatively slow, and though the maximum mortality was reached in the last week of July, the epidemic prevalence declined but little before the last week of August; by the end of September, however, it had ceased. The epidemic did not enter the adjoining district of Damoh till the end of June and beginning of July, and ceasing in September simultaneously with the cessation of the epidemic in the other districts, the time was too short for it to attain to any great degree of prevalence.

From the monthly totals of the province it would appear that the maximum mortality was reached in July, and that there was no marked decline of epidemic prevalence in August. The weekly returns, however, show that the maximum mortality really occurred in the week ending the 19th August, and that, subsequently, the epidemic prevalence declined rapidly and had almost disappeared in the last week of October. In the previous year the course of

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the epidemic had been similar, excepting that the maximum prevalence was not attained till a week later; in both years, however, it declined through September and fell to a minimum in October and November. The limitation of the prevalence of cholera to certain months of the year is perhaps more distinctly defined in the Central Provinces than in any other part of India. In epidemic seasons it appears in February or March, and spreads through the hot and dry months of April, May, and June. In some districts it reaches its maximum of prevalence in June before the rains set in, but more commonly the greatest mortality occurs while the heavy rains of July and August are falling; when they have fallen the epidemic declines, and it ceases with the cessation of the rains in September. In 1876, however, this normal course of events was altered in a remarkable manner in respect of the decline of the epidemic over a considerable portion of the province. In the last week of October the number of deaths from cholera returned from the whole province amounted to only 32, but in that week nearly 200,000 people assembled at the fair annually held at Ramtek, in the Nagpore district, and cholera broke out in this fair on the 31st October. The people then dispersed to their homes, and the statistics of the month of November exhibit a remarkable and abnormal rise in the cholera mortality of those districts which had contributed to the assemblage. The influence of season in controlling the spread of cholera is, however, rendered evident by the temporary nature of this abnormal epidemic accession. In December it again subsided, and in the last week of the year only 35 deaths were reported from the whole province.

In Assam the number of deaths from cholera recorded in 1876 was greater than in the previous year, but the prevalence of the epidemic was chiefly confined to the Seebsaugor district of the Brahmaputra Valley and to Sylhet. In both these districts the epidemic was prevalent at the beginning of the year. In Seebsaugor the mortality increased through the months of February, March, and April, when it reached its maximum; it then declined and fell to a minimum in September. In Sylhet, the mortality in April was but little in excess of that of January; it declined in May, and the epidemic ceased in September. It re-appeared, however, in December.

In Bengal the number of deaths registered from cholera in 1876 amounted to 196,590—88,000, or 80 per cent., in excess of the number registered in the previous year. This enormous increase in the number of cholera deaths registered, the Sanitary Commissioner states, may be partly attributed to improved registration, but the reports of the medical officers show that the prevalence of the disease was much more intense in 1876 than in the previous year. This excessive prevalence of cholera extended over all the divisions of the province; it was most apparent in the districts of the Delta and in Orissa; but it is remarkable that while the district of Noakholly, which includes the islands at the mouth of the Megna, and which was overwhelmed by the cyclone wave on the 31st October, occupies the highest place in respect of mortality in proportion to the population, the hill district of Darjeeling comes next and at no great distance. The cholera rate of mortality in Noakholly was 20·34 per 1,000, that in Darjeeling 18·30.

In Bengal proper, which includes the districts of the Delta, cholera has two periods during which the prevalence of cholera increases, the first extending from March to May, the second extending from October to January, the maximum being reached in December. The period during which the epidemic is least prevalent extends through the months June to September, during which the rainfall is heaviest.

In Orissa and the districts west of the Delta the period of greatest prevalence extends from March to July. September and October are the months of least prevalence, but the period of subsidence does not recur so constantly, and is not so complete and prolonged, as in the districts of the Delta. In Behar, or the north-western districts of Bengal, the period of prevalence extends from March to July, and in the hill districts of Chota Nagpore from March to August, the maximum being attained in Behar in May and in Chota Nagpore in August.

In 1876 the periods of exacerbation proper to each tract of country were well marked, but the greatest mortality occurred in the districts of the Delta during the cold-weather period of prevalence, and especially in those districts which were overwhelmed by the cyclone wave.

In the North-West Provinces the epidemic of 1875 was in December still lingering in the districts of Basti and Budaon, but in January 1876 all signs of epidemic prevalence had disappeared. In Oude, also, the epidemic had in this month almost ceased. In February, however, 143 deaths in Benares gave evidence that epidemic activity had again commenced there, and a slight increase in the number of deaths in Mirzapur and Jounpur, which border on Benares, showed that the epidemic had already spread to those districts. The total number of deaths from cholera reported from all the other districts in February amounted

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to only 12. In Oude, also, only 13 deaths were reported in this month from four districts, 6 of which were in Gonda. In March the area around Benares, in which epidemic activity was manifest, included the districts of Mirzapur, Ghazeepur, Azimgurh, and Allahabad. The number of deaths from cholera had also increased in the Oude district of Fyzabad, and the adjoining districts of Gonda and Barabanki. In April all the districts of the North-West Provinces became involved, also the Oude districts, with the exception of Bahraich, Hurdoi, Sitapur, and Kheri; epidemic activity had also become apparent in the Rohilkund districts and in the hill district of Kumaon. Spreading southward from Benares and Mirzapur, the epidemic reached the Rewah plateau of the Vindhyas. In the latter end of February an outbreak occurred at a fair held near the main road between Rewah and Mirzapur, and from this point the epidemic spread over the Rewah territory in the months of March and April. In May it crossed the Kaimur hills into the Jubbulpore district of the Nerbudda Valley, where in July it met the epidemic which since March had been travelling up the valley. In April, cases occurred also in the districts south of the Jumna; in the end of the month the epidemic broke out in Bhurtpore, and cases occurred in Ulwur. In May and June the limits of the area occupied by the epidemic in the previous months were not much extended, but the mortality within the areas previously occupied rose greatly.

In the eastern districts of the North-West Provinces, in Oude, and in the hill district of Kumaon, the maximum mortality was attained in June; but in the Rohilkund districts not till the month of September. By the end of November and the beginning of December epidemic prevalence had everywhere ceased. In Oude the mortality from cholera in 1876 was little less than in the preceding year; the eastern districts of the North-West Provinces also suffered almost equally in the two years, but west of the line of 80° the epidemic was confined chiefly to the districts of Rohilkund and Kumaon.

The epidemic of the North-West Provinces spread into Gwalior and several of the States of Rajpootana, but in Bhurtpore only was there any great prevalence. In the city of Bhurtpore it prevailed severely in August.

Solitary deaths from cholera were reported from several districts of the Punjab during the first five months of the year, but in none of these months did the number recorded in the whole province exceed eight. In June, 10 deaths from cholera were recorded in the district of Gurgaon and 15 in Rohtak, but with these exceptions all the districts of the Punjab west of the Beas and Sutlej rivers remained free of cholera throughout the year. There was, in fact, a broad tract of country lying between the Ganges and the Jumna, and again between the Jumna and the Beas, which was almost exempt from cholera. West of the Beas the epidemic prevailed with considerable severity from June to November.

In 1875 the epidemic had not extended into any district west of the Ravi, with the exception of Sialkot; here it had appeared in September, and had prevailed to a considerable extent in October, but it had disappeared in November. It had, however, spread to Jummoo, the residence of the Maharajah of Cashmere, and was present there at the close of the year. It had spread also beyond the range of high mountains which separates the valley of Cashmere from the plains of the Punjab. The first case in Srinuggur occurred on the 29th December 1875. Between the 29th December and 24th May, 850 deaths occurred among the population of the city, 87 among the Maharajah's troops, and 905 among the population of the surrounding districts. After the 24th May the prevalence of the epidemic in the city declined, and it ceased almost entirely in the latter end of June. In the latter end of August the epidemic again broke out with great severity and continued to prevail till November. Altogether 5,580 deaths were reported; of these, 2,341 occurred in Srinuggur and 3,239 in the districts. The population of Cashmere is stated to be 491,896,—132,681 in the town and 359,165 in the districts.

Cholera, as before stated, did not become epidemic in the Punjab till the month of June. It first appeared in the district of Jhelum, which borders on the Cashmere territory, and is connected with it by means of the river. There is some uncertainty about the actual time of its appearance, but there is no doubt that the first epidemic outbreaks occurred in places on the banks of the Jhelum river. The Civil Surgeon of Jhelum states that the first cases of cholera occurred in May, and it appears to have been present at the end of this month among the Cashmere coolies employed at the Jhelum Railway Bridge; but the first death from cholera which was recorded occurred in the town of Jhelum on the 12th June. On the same date, a man belonging to a party of Nats, or wandering gipsies, was attacked with cholera at Kushab, in the Shahpur district, about 90 miles further down the river, and in the course of the following week several other cases occurred in this town. On the 17th June the first case occurred in the town of Shahpur, on the left bank of the Jhelum, about 8 miles from Kushab; and on the 29th the disease appeared in the town of Pind Dadun Khan, on the river, midway between Kushab and the town of Jhelum.

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Much information regarding the subsequent progress of the epidemic is given in the report of the Sanitary Commissioner for the Punjab, but I can here give only a general outline. Of the districts that lie between the Beas and the Ravi rivers, Lahore was the only one in which cholera prevailed to any extent during the year; several cases occurred in the station of Anarkali and the city of Lahore in the latter part of June, but the disease did not become epidemic in the city or district till July; it reached its maximum of prevalence in August, and ceased in the end of September. Only 30 deaths were recorded in the city of Lahore, and 12 in the civil station of Anarkali. The city and district of Umritsur remained free of epidemic cholera, with the exception of an outbreak in the town of Taran-Taran in August and September. In the district of Gurdaspur only 11 deaths from cholera were registered during the year, and in the Kangra Valley only 3. In the district of Mooltan, which occupies the southern corner of the Doab, one village on the right bank of the Sutlej suffered severely in October.

Of the districts that lie between the Ravi and the Chenab, Gujranwalla suffered to some extent, the first epidemic outbreak occurring in the town of Wuzeerabad, on the Chenab, on the 14th August. The epidemic appeared about the same time in the district of Sialkot, and prevailed with considerable severity in the following month; it had previously appeared in Jummoo. In the district of Jhang, which occupies the southern portion of this Doab, one village suffered in the beginning of August.

In the two districts of Gujerat and Shahpur, which occupy the Doab between the Chenab and the Jhelum, cholera appeared almost simultaneously in June, the first cases occurring in the town of Shahpur on the 17th, and in a village in the Gujerat district on the 20th. In the Jhelum district, which lies chiefly to the west of the river, the disease first appeared, as I have before stated, in May, but it did not become prevalent till the following month. In the Rawul Pindee district 2 deaths from cholera had been reported in June: but the sanitarium of Murree, which is in direct and constant communication with Cashmere, was the first place in this district in which the disease became epidemic. An isolated case, which appears to have been cholera, had occurred as early as the 22nd May; other fatal cases of a similar nature occurred in the course of the month of June, but the disease did not become epidemic in the place till after the 13th July; between this date and the end of August 107 deaths occurred among the Native population: and the European soldiers at the depôt also suffered severely. In the town of Rawul Pindee the first case occurred on the 19th July, and between that date and the end of September 198 deaths were registered. At these two places 305 of the 626 deaths from cholera in the whole district occurred; the remaining 321 occurred in 140 villages; in only 14 of these did the number of deaths from cholera exceed five.

Cholera appears to have spread from Cashmere through Hazara and across the Indus into the Swat territory in the end of July or beginning of August, and thence further west into the Cabul territories, for reports reached Peshawur of its appearance in both these territories before it appeared in the Peshawur district. The first case in the Peshawur district occurred in the city on the 13th September; it appeared in Tangi, a town across the Cabul river close to the border of Swat, on the 18th; but with these exceptions the district remained free till the beginning of October. The population of the town of Peshawur suffered severely; and there was a severe outbreak among the troops in cantonments.

The district of Kohat remained free till September, and suffered but little.

In the Bannu district a severe outbreak occurred during the month of July, in the Mianwali sub-division that lies to the east of the Indus contiguous with Shahpur, but the epidemic did not appear to the west of the river till the latter end of August. Here the first case occurred on the 21st of the month, at Kalabagh, where there is a ferry, and the main route from Rawul Pindee to Bannu crosses the river; 12 deaths occurred in this town during September, but the epidemic did not become prevalent in this part of the district till the beginning of October. It appeared in the town and cantonment of Bannu on the 6th October, and about the same time it became prevalent among the Wuzeeries across the border.

In Dera Ismail Khan, also, cholera appeared in a village east of the Indus in July, but it did not cross the river till the beginning of September. On the 16th of the month it appeared in the sudder town, and subsequently spread to cantonments.

In the district of Dera Ghazee Khan five deaths from cholera were recorded in the course of the year—one in May, three in June, and one in August.

Further south in the Trans-Indus country, as before described, cholera was present in the Kutchi desert in April, and from thence appears to have been conveyed to Kandahar, where it broke out in the beginning of July. No outbreak appears to have occurred in the city of Cabul till the 9th November, but it was prevalent before this in the territories that lie between Cabul and the British Frontier.

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In the preceding paragraphs I have given a short description of the epidemic cholera that spread over India in the course of the two years 1875–1876. In all parts of the country the prevalence of the epidemic was subject to great fluctuations, but the periods of prevalence and subsidence in the two years, though varying in different parts of the country, coincided in a great measure with certain seasons. The rise, culmination, and decline of epidemic prevalence over given areas recurred in both years at the same seasons. Indeed, the variations in the prevalence of cholera follow so closely the changes of the season in different parts of India that it is impossible to reject the inference that there exists some relation between them.

On the other hand, we find cholera prevailing under such totally opposite conditions of atmosphere, and its incidence on populations is so partial and uncertain, that we are driven to the conclusion that the action of these atmospheric states on the human system is not direct, but through the medium of some one of the conditions, it may be of soil or it may be of water-supply, under which the individuals or populations affected are living, and this condition, whatever it may be, must be capable of becoming subservient to the production of cholera under very opposite states of the atmosphere, during periods of intense heat and dryness, under great cold, or during periods of great moisture and heavy rain. If cholera were produced by miasma arising from the soil, we might expect its periods of greatest prevalence to coincide in a great measure with the seasonal prevalence of ague, and to recur annually after the soil has become saturated with moisture and is drying up. If on the other hand impure and contaminated water were the condition that determined the incidence of cholera on a population, outbreaks might occur under any condition of atmosphere, but they would be most frequent during prolonged periods of drought and during the monsoon rains, especially in the early portion when the impurities that have accumulated on the surface of the ground during the dry season are being conveyed into the sources of water-supply. They would be least prevalent after the periodical rains have ceased, when the surface of the ground has been cleansed, and the sources of water-supply replenished. Further, if impure and contaminated water is the chief condition determining the incidence of cholera, the season in which epidemics will prevail most widely over a tract of country would depend very much upon the nature of the water-supply used by the people. If it is drawn to a large extent from tanks or other sources in which it is stagnant and subject to deterioration by rapid evaporation, cholera will be most prevalent during the hot and dry season of the year, and its prevalence would be greatly aggravated in seasons of drought; the same will be the case in elevated and rocky tracts of country where the streams run nearly dry, retaining water only in stagnant or nearly stagnant pools. On the other hand, if the water-supply is drawn chiefly from wells, cholera will prevail to a less extent during the hot weather, but will increase during the rains as the wells become filled by percolation from the surface, and this increase will have some relation to the nature of the soil and the depth of the water in the wells from the surface of the ground.

A satisfactory conclusion on these points can only be arrived at by a minute examination of the circumstances under which outbreaks have occurred, but indications of the direction which enquiry should take may be obtained by ascertaining the general relation between the prevalence of cholera and atmospheric changes; and as the collection of meteorological data has for the last two years been brought under systematic supervision, and observations are recorded with fair accuracy in many localities in all parts of the country, it seems desirable that the study of the general relation between meteorological changes and the prevalence of cholera should be undertaken, and with this view I have tabulated the monthly mortality from cholera during the years 1875 and 1876, with the meteorological data collected at certain stations in different parts of India.

* * * * * *

The results show that, although the disease may occur under any state of the weather, the atmospheric condition most frequently attending its prevalence is that of great heat and dryness; that the condition which after heat and dryness favours the spread of cholera is rainfall; but that, although the action of rainfall on the prevalence of cholera may be at first favourable to it, it is in the end antagonistic and tends to bring about its subsidence. There seems to me little room for doubt that the influence of these opposite conditions on the prevalence of cholera is due to their action on the water-supply of the people. In Tanjore on the sea coast, where the water-supply is largely drawn from tanks and irrigation channels, cholera prevailed with the greatest violence in the dry weather and when the supply from these sources was scanty; the prevalence diminished when the supply of water increased, but rose again in two successive years as the deficiency of water recurred. The district of Bellary on the Mysore plateau, with a drier climate and more scanty rainfall, affords evidence to the same effect, the prevalence of cholera here having been greatly intensified and prolonged by the failure of the monsoon rains and consequent drought. In the Nasik and Poona districts,

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which occupy a portion of the basaltic plateau of the Bombay Presidency, and in the alluvial districts of the Nerbudda Valley, regions in which the people draw their water-supply largely from streams, the prevalence of cholera was almost entirely confined to the dry and hot months, and it quickly subsided when the streams were flushed by heavy rains. From the dense populations of the Gangetic delta, where the water-supply is drawn to a very large extent from sources in which it is stagnant and subject to deterioration by rapid evaporation, and to contamination from various sources, cholera is never absent, but its prevalence increases annually during the prevalence of the dry westerly winds when evaporation is most rapid, and in 1876 an abnormal increase in the mortality annually occasioned by it ensued in certain districts upon the general contamination of the water-supply that resulted from the inundation by the cyclone wave.

In the eastern districts of the Gangetic plain, where the people draw the water to a considerable extent from exposed sources of supply, but less so than in the delta, cholera annually increases in prevalence as the hot and dry winds set in, and occasions the greatest mortality in the later months of the hot weather, subsiding after the rains have set in. In the tea gardens of Darjeeling the prevalence of cholera in 1876 commenced in the early months of the year, when the water-supply was less abundant than usual, reached its maximum of prevalence while the first falls of rain were polluting the springs, but subsided after the heavier rains came down.

In the valley of Cashmere, with its beautiful climate, cholera first appeared in December when the snow was on the ground, and continued to prevail through all the seasons of the year. The population of Srinuggur suffered most from the epidemic while the rains were washing the filth of the city into the river which forms their chief source of water-supply, and experienced a respite from its ravages in June and July when the weather was hot and dry.

In the arid tracts on the east bank of the Indus cholera first appeared, and committed great havoc in certain villages, when the weather was intensely hot and dust-storms were frequent; while in others drawing their water-supply from an open stream it prevailed with severity after rain had fallen. In the intensely hot and dry weather of April, cholera attacked the troops croosing the Kutchi desert, where the water was scanty and bad, and when a dust-storm of 48 hours duration aggravated their distress, but left them when they reached a cooler region with running streams. In Kandahar cholera broke out in July when the weather was unusually hot; the first outbreak in Cabul occurred in the cold month of November, and was attended with hail and heavy rain.

Elevation has no influence on the prevalence of cholera. The epidemic of 1876 was quite as virulent and fatal at Darjeeling and Murree, 7,000 feet above the sea, as in the delta of the Ganges, and it found the specific condition necessary to its prevalence in the villages on the route into Cashmere at the high altitude of 11,000 feet.

It may seem too much to say that, wherever cholera prevails, impure water is present as one of the factors of the epidemic; that the half-million of deaths from cholera registered in India in 1876 would not have occurred had the water-supply of the people been pure and sufficient; but the incidence of cholera on a population is evidently dependent on the presence of some specific insanitary condition; and in all the illustrations that have now been given of the relation between meteorological changes and cholera, the circumstances of climate, position, geological formation, local surroundings, and habits of the people were conducive to deterioration and contamination of the water-supply; and one finds it difficult to imagine any other specific favouring condition capable of development under circumstances so different and opposite. What may be the nature of the connection between cholera and impure water, I do not propose here to discuss; but the evidence that has been given will perhaps be allowed to be confirmatory of the opinion which has found acceptance in many quarters that there is an intimate connection between them, and that efforts having for their aim the prevention and diminution of cholera are most likely to attain that aim when directed towards improvement of the water-supply.

Small-pox. In Bengal small-pox was not very generally prevalent. Of the four great divisions of the province, the rate of mortality from small-pox was highest in Orissa (0·38), lowest in Bengal Proper (0·11); a few of the towns and circles in each division suffered severely, and the Sanitary Commissioner remarks that in the majority of these localities the Act prohibiting inoculation is not in force. In Oude small-pox was on the whole slightly less prevalent than in the preceding year, but the mortality from this cause was high in the districts of Sitapur and Kheri, which border on Rohilkund. In the North-West Provinces the mortality from small-pox was higher than in any other province. Excessive prevalence was, however, confined to the districts of Bundelkund and Rohilkund and to two districts of the Doab. In the Punjab small-pox was on the whole slightly less prevalent than in the preceding year. The districts of Gurgaon and Sirsa in the eastern division and the frontier districts generally

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show the highest rates of mortality from this cause. In the Central Provinces the epidemic of small-pox which had been spreading during the previous three years had attained its maximum of prevalence in 1875, the mortality in that year being equal to 2·73 per 1,000. The statistics for 1876 exhibit a marked decline in the prevalence of the disease, the rate of mortality for the whole province being 0·52 per 1,000. The district of Burhanpur, which borders on the Bombay Presidency, is the only district that shows a marked increase in the mortality from this cause compared with the previous year. In Berar the mortality from small-pox in 1876 was very slight, being only ·19 per 1,000. The epidemic which had commenced in 1871 died out in the end of 1875, but in the latter end of 1876 signs of a new epidemic commenced to appear in the district of Buldana, which borders on the Bombay Presidency. The statistics of the Bombay Presidency exhibit a marked increase in the prevalence of small-pox. This increased prevalence commenced in the early months of the year, and, though the mortality as usual fell to a minimum in September and October, a sudden rise took place in November, and the mortality of December was more than 14 times that of the corresponding month of 1875. The statistics of Madras also show a marked increase of mortality from small-pox in the last month of 1876. In Burma small-pox was more prevalent in 1876 than in the previous year. In Assam it was apparently less prevalent.

Fevers.

In the mortuary statistics of the general population by far the greatest portion of the mortality is ascribed to fevers. This is so very contrary to what is presented by the accurate statistics of the jails and the Native troops that considerable deduction must be made from the fever mortality of the general population as represented by the statistics before taking it as a means of estimating the prevalence of fever in different parts of the country.

The number of deaths among the general population of the Bengal Presidency registered under the head of fever in 1876 ranged from 66 per cent. of the total deaths (exclusive of cholera deaths) in Bengal to 83 per cent. in Oude. Among the Native troops of the Bengal Army the percentage of fever deaths on deaths from all causes amounted to only 18 per cent., and among the convicts to only 6 per cent. The deaths from respiratory diseases among the Native troops of the Regular Army considerably exceeds the mortality from fevers. In the Punjab the number of deaths registered under fevers from among the total population in 1876 was equal to 72 per cent. of the total deaths; the number of deaths registered from causes other than the few specified in the registers being equal to only 21 per cent. of the whole. Among the Native troops serving in the Punjab the deaths from fever in the same year were equal to 21 per cent. of the total deaths; the deaths from respiratory diseases amounted to 34 per cent. of the total deaths. Considering that the great mass of the population are neither so well housed nor so well clothed as the sepoy, it is not probable that the relative proportion of deaths from fevers to deaths from respiratory diseases is greater among the general population, and it may be estimated that, taking the whole province and one year with another, a very considerable proportion of the deaths entered in the Punjab registers under the head of fevers are in reality deaths from diseases of the respiratory organs; and I believe that in all provinces the mortality registered under the head of fevers must be taken to represent to a considerable extent the mortality from all diseases other than small-pox, cholera, bowel complaints, and injuries.

It may, however, be assumed that where excessive death-rates appear a large proportion of the mortality has resulted from fever of some form.

In Assam, Burma, Madras, and Bombay the ratio of mortality from fever was lower for 1876 than for the preceding year. In all the other provinces it was considerably higher. In Assam and Burma the registration of deaths is so imperfect that it would not be safe to draw any inference from the slight difference in the ratios of registered mortality from fevers. In Madras and Bombay, from the failure of the monsoon rains and the drier season, fever may perhaps have been less prevalent than usual. With reference to the higher rate of mortality from fevers shewn by the statistics of Bengal the Sanitary Commissioner states that it must be attributed to improved registration, but the extracts which he gives from the reports of the district medical officers show that, although the epidemic fever which a few years ago prevailed so widely and fatally in Lower Bengal has in a great measure disappeared, in very many districts the malarious fever of the autumn months is still disposed to assume a fatal epidemic type; the causes generally assigned for this tendency are obstructed drainage and foul water. The special reports on the prevalence of fever promised from Oude have not been received. The districts of Kheri and Pertabgurh exhibited high death-rates from fever in 1876. In the North-West Provinces, the Terai, as usual, shows the highest mortality from fever. Cawnpore yields the next highest rate, and this the Sanitary Commissioner attributes to the circumstance of canal irrigation having been lately extended in the district. In the districts of the Upper Doab the decline in the prevalence of fevers which was apparent in the statistics of 1875 continued in 1876; this the Sanitary Commissioner considers due partially to the gradual acclimatization of the inhabitants to the changes brought about by

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canal irrigation, but in a greater degree to the improved drainage of irrigated land which has been effected by the Irrigation Department.

Fever was unusually prevalent during the year in the Mirzapore district, especially in the circles south of the Ganges; the result, in the Sanitary Commissioner's opinion, of an excessive monsoon rainfall following a season of unusual heat and dryness; and to the same cause is probably due the greater prevalence of fever generally over the high lands of the Central Provinces.

During the first five months of the year little or no rain fell, and the hot dry season was prolonged; the monsoon rains, though delayed, were generally abundant.

In the Punjab there was excessive prevalence of fever in certain districts on which there had been excessive rainfall in July. The mortality was greatest in the districts of Jullundur and Hoshiarpur, in which irrigation is extensively carried on. The causes of this excessive prevalence of fever are now being investigated by the Sanitary Commissioner. The Punjab is subject to these exacerbations of the annual autumnal fever, and the Sanitary Commissioner remarks that it has been observed that in years of cholera visitations in the Punjab malarial fevers have also been unusually prevalent, and he believes that the two diseases are often mistaken the one for the other. It is, however, a very remarkable circumstance in relation to the etiology of cholera that in 1876, when both diseases were unusually prevalent in the province, the districts whieh suffered most from fever escaped cholera; and, on the other hand, the fever mortality was comparatively low in the districts that suffered most from cholera. The following are the ratios of mortality from the two diseases in the six districts in which fever prevailed most severely:—

	Death-rate from Fever.	Cholera.
Jullundur	48·47	0·00
Hoshiarpur	36·19	0·00
Gujeranwalla	34·74	0·49
Sialkot	32·77	0·46
Umritsur	30·48	0·04
Gurdaspur	27·69	0·00

The following are the ratios of mortality from the two diseases in the six districts in which cholera chiefly prevailed:—

	Death-rate from Cholera.	Fever.
Bannu	3·47	9·43
Peshawur	1·27	7·38
Shahpur	1·37	11·53
Rawul Pindee	0·89	11·53
Gujerat	0·93	16·37
Lahore	0·93	24·96

In the district of Jullundur 37,952 deaths were registered under the head of fever, not one under the head of cholera.

Bowel complaints

The deaths registered under bowel complaints in the different provinces in 1876 yield very nearly the same ratios as those for the previous year. Berar is the only exception; it still occupies the highest place in the statistics of mortality from this cause, but the ratio for 1876 was somewhat less than that for the previous year. As registration of deaths is apparently more efficient in Berar than in other provinces, and the statistics exhibit this high death-rate from bowel complaints year after year, there is good reason to believe that some special cause productive of this disease does exist in the province. The rainfall is very scanty, the average fall being less than 28 inches, nearly the whole falling in the four months June to September; and the water-supply is acknowledged to be generally insufficient and bad; at the end of the hot weather the supply becomes nearly exhausted, and during the rains the sources of supply are replenished almost wholly from surface drainage. It is at this season of the year, in July, August, and September, that the greatest mortality from bowel complaints occurs; but how far any relation exists between the great prevalence of bowel complaints and the nature of the water-supply can only be ascertained by enquiry on the spot. The rate of mortality from bowel complaints varies greatly in different parts of the province. The rate for the district of Akola (the central district of the province) for 1876 was 10·4 per 1,000, but the rate for Wun was only 2·9, differing very little from that of the adjoining district of Chanda in the Central Provinces, which was 2·05; the rate for Buldana, the most westerly district, was 4·7, while that of the neighbouring district of Nimar in the Central Provinces was 5·02. Even in the district of Akola the high rate of mortality from bowel complaints is by no means equally distributed; the mean rate of ten towns in the district was 13·3 per 1,000, in Hiwarkhed it was 23, in Khamgaon it was only 4. A comparison of the position, soil

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drainage, and nature and quality of the water-supply, of these different localities might perhaps afford a solution of the problem.

In several of the reports of the local Sanitary Commissioners instances are given in which deaths from cholera have been registered under the head of bowel complaints. In the Malabar district of Madras, in the Ellichpur district of Berar, in several districts of the Central Provinces, in Burma, and also in Bengal, this occurred; in all these instances the cause of death had been reported by the police as cholera, but the medical officer of the district, either from the reported absence of some symptom which he considered diagnostic of cholera or from the large number of *lumbrici* evacuated, had the deaths entered under the head of "bowel complaints" or "other causes." It would be better in such cases to enter the cause of death as reported by the police, and before altering the register to report the circumstances to the Sanitary Commissioner of the province for opinion and enquiry.

Mahamurree in Kumaon and Gurhwal.

Of the other diseases which have contributed during the year to the mortality among the general population, the recurrence of "mahamurree" in the hill districts of Kumaon and Gurhwal may be noticed.

Dr. Planck made a thorough inspection of the villages in which this disease occurred, and has given in his annual report a full and interesting account of the outbreak and of the nature of the disease. A short note on the same subject is also furnished by Dr. Watson, Superintendent of Vaccination. Both officers agree in the opinion that in its nature the disease is identical with Egyptian plague. Epidemic outbreaks have occurred previously in these hill districts at intervals of from 10 to 15 years, but, notwithstanding that it spreads rapidly by infection among the hill people, it has never spread to the population of the plains below. Dr. Planck is disposed to attribute the development of the disease to the insanitary condition of the villages, especially to the custom that prevails among the people of keeping their cattle in the same houses in which they themselves live. Dr. Watson, on the other hand, is of opinion that the disease arises from the use of decaying grain, especially a grain much used by the people of the districts in which a peculiar fungus is generated.

Violent deaths

The deaths from injuries, and the details of the principal forms of these injuries, are given in the following table:—

	Deaths from Injuries.				Total.
	Suicide.	Wounding.	Accident.	Snake-bite or killed by wild beasts.	
Bengal	2,183	1,584	40,151	10,062	53,980
North-West Provinces	1,468	1,093	7,136	3,790	13,487
Punjab	189	180	3,354	1,024	4,747
Oude	632	303	2,698	1,431	5,064
Central Provinces	598	190	1,518	1,049	3,355
Berar	148	42	545	208	943
British Burma	49	84	196	157	486
Madras	1,715	896	6,187	2,377	11,175
Bombay	773	434	3,463	1,258	5,928
Assam (not including Hill Districts)	38	51	326	326	741

The deaths registered under the head of "Snake-bite and killed by wild beasts" were more numerous in 1876 than in the previous year in Assam, Bengal, and the Central Provinces; less numerous in all the other provinces. The increase in the number registered under this head in Assam and Bengal is no doubt attributable to more extended and improved registration of deaths. The number registered under this head in Bombay is less than half the number of the previous year.

Sanitary Works (Bengal).

Military works.

During the financial year 1876–77 a grand total of Rs. 72,59,173 was expended on works designed more or less to add to the health and comfort of the troops, and more particularly of the British troops in the Bengal Presidency. Of this sum Rs. 30,78,592 were devoted to original works, Rs. 23,97,702 to repairs, and the remainder to establishment, &c. The following are the more important of the works carried out:—

The additions to the women's hospital at Dhullunda, which is the hospital for the garrison of For William, Calcutta, have been completed.

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A system of masonry drains to improve surface drainage of the compound of the above-mentioned nospital has also been completed.

At Jullapahar, Darjeeling, drains round the barracks have been commenced, and three-fourths of the work were completed during 1876–77.

At Benares a new hospital for Native Infantry was completed in 1876–77.

A hospital for Native Infantry at Saugor was built and completed during 1875–76. The out-offices, &c., for the same were completed in 1876–77.

At Nowgong the Dharea Nulla improvements, consisting of straightening and deepening the channel above the Sudder Bazaar towards the new cantonments, have been completed.

Subsidiary buildings for British Infantry hospital in new cantonments, Allahabad, have been completed.

A new hospital with new enclosure wall has been commenced on a spare piece of ground west of the Military Prison, Lucknow, to give more space in, and improve the ventilation of, the prison ; work was well advanced.

Hospital with out-offices for women at Fyzabad has been commenced.

Subsidiary buildings for the General Hospital at Gwalior have been completed.

The dam at Morar has been improved, so that the great rise of water during floods previously complained of does not now occur.

A new hospital for Native Infantry at Dehra Doon has been finished, together with its subsidiary buildings.

At Chukrata subsidiary buildings for the hospital, except purveyor's store, have been completed.

A hospital for women with out-offices has been completed at Ranikhet.

Also at Ranikhet, apothecary's quarters, apprentice's quarters, with their respective out-offices, have been completed, and the site for hospital buildings has been cleared.

At Koompore, Ranikhet, the springs of water have been covered in.

The drainage of roofs and bath-rooms of Family Barracks, British Infantry lines at Delhi, has been completed.

The encamping grounds on the Ranikhet and Ramnuggur Cart Road have been improved: terraces for tents made, connecting roads constructed, road to water-supply improved ; at Dunpan two water tanks, one for drinking water and one for cattle, have been constructed; at Ansoth, a new camping ground, the trees have been cleared, roads made, tanks constructed, and water from springs about a mile distant, which give a constant good supply, has been led to the camping ground.

A hospital for men with subsidiary buildings has been commenced at Koompore, Ranikhet. The hospital walls were in progress, and a quantity of materials collected. The subsidiary buildings are nearly completed.

At Morar a hospital for Native Infantry has been commenced, the superstructure was nearly completed, and the subsidiary buildings commenced.

At Jullundur drains from wash-houses in British Infantry lines have been completed.

The Goorkha hospital at Lower Dhurmsala has been improved by alteration and addition.

Additions and alterations to the Goorkha hospital at Bukloh so as to provide the full authorised accommodation have also been completed.

The Family Barracks at Kasauli have been re-floored. This work was commenced in 1875–76 after the cholera epidemic, and was completed in 1876–77.

At Dagshai the re-flooring and improving of old barracks was commenced: Barracks Nos. 1, 2, and 6 were re-floored, Nos. 4 and 5 about half done. Improvements to Barracks Nos. 1 and 6 finished, and about one fifth of Nos. 4 and 5 done. These works are in abeyance, Government not having found it possible to provide any money for them during 1877–78.

New barracks at Sabathu were commenced in 1875–76 ; since then no progress possible owing to want of funds.

The two blocks of barracks for families and children of British Cavalry at Dagshai, built from funds given by Sir F. Fitzwygram, have been very nearly completed.

New water-supply at Umballa. The arrangements for temporary supply, the design for which included part of work that will be required in permanent supply, were practically finished. Water was first conveyed into cantonments on 21st April (that is, during this current official year), and since then water to the amount of from 50,000 to 90,000 gallons a day has been coming into cantonments.

The drainage of the British Infantry lines at Meean Meer has been completed as provided for in sanctioned estimate.

The drainage of Royal Artillery lines at Meean Meer is also being improved.

Drainage round No. 4 barrack at Baloon near Dalhousie has been completed.

The water-supply project for Dalhousie has been nearly completed.

The water-supply at Meean Meer has been commenced, but has made no progress during 1876–77 owing to fresh estimates having to be made out.

Ten single men's barracks at Campbellpore have been re-roofed and generally improved.

At Peshawur the water-supply is still in progress ; during 1876–77 the sum of Rs. 1,62,568 was expended on this work. It is being vigorously pushed on.

At Murree the construction of quarters for hospital servants has been commenced and was about half-finished during 1876–77.

Also at Murree a lock hospital has been commenced. The main buildings had been erected up to roof level ; the subsidiary buildings had not been commenced.

As regards filtration of drinking water for troops, the question of the best suitable filter with lifting apparatus is still undecided. The construction of experimental filtering tanks, on a design approved by the Sanitary Commissioner, has been ordered at Jullundur, Umritsur, Allahabad and Bareilly.

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Sanitary supervision of villages near cantonments.

The following instructions have been issued by the Government of India to the several Governments and Administrations in the Bengal Presidency:—

"On reconsideration of the subject the Government of India have come to the conclusion that something more is required for the inspection of the sanitary condition of villages outside cantonments than can be done by the local Sanitary Commissioner; and perhaps this can be usefully and inexpensively done by appointing, in the first instance, local committees of inspection. It will not be necessary to do this at once for all cantonments; the experiment may properly be tried in one or two larger cantonments in each province, and committees might be appointed at once to inspect all villages within a radius of five miles of the cantonments named. A civil medical officer of experience, an Assistant or Joint Magistrate, and a selected military officer (if practicable, the local officer of the Quarter-Master-General's Department) would be the most suitable officers for the work. Where circumstances do not admit of the services of these officers being made available, a medical officer attached to a regiment in the cantonment and some other civil officer of the district, if possible with local experience, may be appointed.

"The primary object in appointing these committees is to ascertain, as a preliminary step to the best action practicable, what is the actual state of villages in the neighbourhood of cantonments; whether they are in reality a source of danger to the troops in cantonment; and, if the insanitary evils that may be found to exist in them are removable, what measures are practicable for their removal, and what the cost of such measures will be. The attention of the committee should be directed more especially to the drainage of the site of each village and of the ground around it, to the sources of water-supply and their liability to pollution, and to the general condition of the village in respect of cleanliness and conservancy. It will probably not be possible to introduce the use of latrines in villages, and in fact latrines are worse than useless when they cannot be under proper inspection, but the committee might, when inspecting villages, report what improved arrangements for conservancy are feasible. For instance, it would greatly conduce to the sanitation of villages if the cattle, which as a rule are tied up inside enclosures, could be removed to a short distance outside the village; this change would no doubt be one of great difficulty for many reasons, and certainly could not be at once carried out, still with some trouble the objections to it might be gradually overcome. Care must of course be taken in any schemes of sanitary reform in villages around cantonments not to offend the prejudices of the villagers concerned. It is impossible for any Government agency to keep villages clean, but the villagers may in time be educated to see the advantages of cleanliness. What is chiefly required is to prevent the people fouling localities near the sources of water-supply. A record of the actual state in these respects of the villages from which cantonment supplies are drawn would afford useful information to the military and civil authorities.

"The committee should be allowed to examine into sanitary measures within cantonments so far as these are connected with the subject of their enquiry, and should be directed to prepare estimates for carrying out the objects suggested above, especially as regards the water-supply. The committee should also submit duplicate reports, one to the Quarter-Master General of the Army, and the other through the Local Government to the Home Department.

"The time which the committee would be called upon to devote to this inspection will vary according as there are few or many villages around the several cantonments. While in some places a couple of months will suffice, in others more will be required; but it is anticipated that in all cases the cold weather will give ample time for the proposed enquiry. It is not anticipated that any large expense will be involved in these arrangements, but any such expense will be a military charge."

Civil works.

The reports of the local Sanitary Commissioners afford satisfactory evidence that the need of employing the funds at their disposal as much as possible in removing the many insanitary conditions by which the people are surrounded is very generally recognised by the civil authorities, but the want of funds everywhere renders the undertaking of great works impracticable; and even as regards minor improvements, which could in a great measure be effected by the people themselves with very little outlay of money, the apathy and unwillingness of the people to co-operate render sanitary progress very slow. Efforts are being everywhere made to impress upon the people the value of pure air and water and cleanliness round their dwellings, and to stimulate them to help themselves in these matters, and in the large centres of population among the better educated classes better notions are perhaps beginning to prevail, but on the mass of the people no impression has been made.

In Calcutta and its suburbs measures having for their object the improvement of the water-supply of the people have been systematically carried out, numerous tanks containing foul water have been drained and filled up, and proposals for extending the service of filtered water are under consideration. A more thorough and complete system of conservancy has also been brought into operation.

With regard to the districts of Bengal the improvements that have been carried out are no doubt very small when the insanitary conditions that abound in all directions are considered, but the report of the Sanitary Commissioner affords evidence that the connection between impure water, obstructed drainage, and want of cleanliness and proper conservancy is very generally recognised by the authorities, and improvements in these respects are effected where funds for the purpose are available. The Sanitary Commissioner furnishes a statement showing the income of 138 municipalities in the province, and the amount expended by each on sanitary work and establishment. On the average the expenditure under this head amounted to 24 per cent. of the total income, but in many it was less than 10 per cent.; in others it ranged between 30 and 40 per cent.

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In the North-West Provinces improvements take the form chiefly of drainage of the sites of towns, the reclamation of unwholesome tanks, and the filling up of foul water holes and excavations. In many districts considerable sums have been spent on works of this nature, notably in Terai, Bareilly, Shahjehanpore, Boolundshuhr, and Goruckpore. In the district of Meerut the importance of removing the many insanitary conditions by which the people are surrounded appears to have been more fully recognised than in any other district, and the magistrate has exerted his influence with good effect in pushing on drainage works and other improvements in most of the towns within his jurisdiction. The drainage cuttings planned by the Irrigation Department for the more perfect drainage of the Upper Doab country have been extended, and the good effects of these works in diminishing the prevalence of fever in the Meerut district are annually becoming more apparent in the death-rates. In Benares a large sum was expended in preparing a scheme for the water-supply and drainage of the city, but the scheme has been long in hand, and appears to make no progress towards construction. Benares being the chief centre of attraction to the Hindus, to which pilgrimages are made from all parts of India, the importance of placing it in the best sanitary condition possible cannot be too strongly insisted on. Cholera prevails in the city every year, and there is good reason to believe that from it as a centre epidemics radiate to very distant parts of India.

In the hill districts of Kumaon and Gurhwal the re-appearance of "mahamurree" has attracted the attention of the authorities to the state of the villages, and earnest endeavours are being made to improve their sanitary condition, more especially to bring into general use the custom of providing separate accommodation for the cattle, which have hitherto been lodged in the lower rooms of the dwelling-houses.

In the Punjab, efforts in the way of sanitary improvements are chiefly directed towards improving the water-supply of towns; surface drainage and conservancy also meet with a fair share of attention.

A water-supply and sewerage project for the city of Lahore at a total cost of upwards of 13 lacs has been sanctioned. In the other towns sanitary work has consisted chiefly in cleaning and repairing wells and tanks and constructing new ones, filling in excavations containing foul and stagnant water, and the adoption of more systematic arrangements for conservancy.

In the Central Provinces there are very few large towns, the districts are for the most part very sparsely populated, and the local funds are very poor. Under these circumstances improvements have been limited to minor works. As the country is hilly and the natural drainage good, drainage works are not so much needed as in other parts of India. On the other hand, the water-supply is generally scanty, and such funds as are available are chiefly devoted to improvements of the water-supply and conservancy. In Saugor, Damoh, Chindwara, and one or two other districts, efforts have been made to improve the water-supply of the villages, but on the whole not much has been effected. In the city of Nagpore the water service has been extended, and now nearly the whole city is supplied with pure water. In Burhanpur, and in Raipur also, considerable sums of money have been spent in improving the supply of drinking water. In Seoni a scheme was in preparation for bringing filtered water from the large reservoir into the town for the use of the people. The excessive mortality in the Jubbulpore, Saugor, Nursingpur, Wardha, and other of the sudder towns during the epidemic season of 1876 indicates urgent need for radical improvement in the water-supply of these places.

In Berar the Sanitary Commissioner's urgent recommendation that measures should be taken to increase the area of village sites, and to enable the people to keep their cattle outside the villages, has been acted on to a slight extent, but the Sanitary Commissioner pleads that more general action should be taken in these matters.

General Remarks.

Cholera diffusion.

This section is intended to include "observations on the progress of research into disease "causes and matters of a simlar nature." Under this head I may refer to the paper by Drs. Lewis and Cunningham on "cholera in relation to certain physical phenomena," which forms an appendix to this report, and which is a contribution towards the special inquiry into the causes of cholera sanctioned by the Secretaries of State for War and for India. In this paper the inquirers discuss more especially the relation of cholera to the soil, and the changes that take place in it under varying meteorological conditions, and the result of their inquiries is to incline them to place cholera in the category of diseases dependent upon miasmata developed in the soil. In the section of this report devoted to the history of the chief diseases from which the general population of the country has suffered during the year an attempt has been made to describe the spread over the country of the cholera epidemic of 1875–76,

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and to show the meteorological conditions by which it was attended in the districts and localities where its prevalence was most severe. The evidence there adduced seems to me sufficient to give cholera a place in the category of epidemics that are spread by infection, and to point to impure water as the most common condition that determines its incidence on particular populations. At the same time I willingly acknowledge that the reasons against this doctrine advanced by Drs. Lewis and Cunningham, after so much close investigation, deserve careful consideration, and it will perhaps be considered an advantage that evidence bearing on two different aspects of so important a subject should appear in the same volume.

(*In the paper by Doctors Lewis and Cunningham above referred to the following conclusions are expressed with regard to the theories of cholera diffusion.*)

In the earlier part of this report an attempt has been made to ascertain the character of the local physical conditions coinciding with the various degrees of cholera prevalence in Calcutta at different times during the course of the year. The information thus obtained has next to be considered in reference to various current theories relative to the essential causation of the disease.

The most important theories are the following :—

1st.—That which regards cholera as essentially caused by direct contagion,—by the direct transfer of a poison, manufactured within the human organism, from one person to another: According to it, any fluctuations in the prevalence of cholera must be dependent on corresponding fluctuations, either in opportunity of transfer, or in the susceptibility of human beings to the influence of the poison.

2nd.—The so-called 'water theory.' In this, also, the human organism is regarded as the factory in which a specific poison is produced. By one set of the supporters of the theory, water is regarded merely as one means—although by far the most important and influential means—by which the poison is diffused,—is transferred from one person to another. By other authorities, however, water is not regarded as a mere vehicle, but as the medium in which the material produced within the human organism attains its maximum of virulence. According to this theory, fluctuations in the prevalence of cholera must essentially depend on corresponding fluctuations in conditions determining or facilitating the transfer of materials produced within the human organism to the water, and specially to the drinking water.

3rd.—The theory which, while regarding the drinking water of a locality as essentially determining the prevalence of cholera in it, does not regard its influence as necessarily dependent on the introduction of any specific material manufactured within the bodies of those suffering from the disease; it holds that the drinking water determines prevalence, both by its effect on personal susceptibility, and by being the essential medium in which the specific poison is developed. In any case, the quality of the drinking water of a locality is regarded as the essential determinant of the fluctuations in the prevalence of cholera in it at different periods. Any fluctuations of prevalence in localities in which cholera is epidemic are regarded as depending on corresponding fluctuations in the quality of the water, increase and decrease in prevalence being due to increase and decrease in the impurity of the water.

4th.—The theory which regards the soil as the essential site of the processes resulting in the production of the material inducing cholera. The majority of the adherents of this theory regard the air as the vehicle by means of which the material produced in the soil is conveyed to human beings, so as to cause the disease in them; but it is obvious that questions of vehicle are really subordinate here, and that materials manufactured in the soil may reach the human subject by more than one path. According to this view, fluctuations in prevalence of cholera are dependent on corresponding fluctuations in the condition of the soil, which may act either on the manufacture or the diffusion of the specific materials.

We have now to inquire how far each of these theories is capable of accounting for the phenomena of seasonal fluctuations exhibited by the prevalence of cholera in Calcutta.

1st.—The theory of direct contagion. It may be deemed superfluous, at the present day, to enter into the serious consideration of this doctrine, still as it is yet advocated by some whose opinions are entitled to respect, it is necessary to determine the bearing of our data upon it. The normal course followed by the fluctuations in the prevalence of cholera in Calcutta is not merely inexplicable by this theory, but is strongly opposed to it. If prevalence were dependent on direct contagion, the maximum prevalence should occur at those times of year when the population is most liable to close association. As a fact, the maximum prevalence in Calcutta occurs during a period when there is less crowding together or close association of the population than in either of the periods immediately preceding and following it. The native population is more crowded together during the height of the cold weather and of the rains than at any other time of year; for it is then that the people are

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obliged—by the temperature in the one case, by the rainfall in the other—to pass the nights packed together in their houses, instead of spending them largely in the open air. According to this theory, the prevalence of cholera ought to attain its maximum in December and January, and in July and August; but, instead of this being the case, these are precisely the periods during which prevalence of the disease is at its lowest ebb.

2nd.—The 'water theory,' as ordinarily understood. This theory, also, fails to explain the phenomena of seasonal fluctuation in prevalence, or to gain any support from them. According to it, maximum prevalence ought to occur at that period of the year when the meteorological conditions are of a nature calculated to facilitate the entrance into the drinking water of materials derived from the bodies of those suffering from the disease, and specially of the materials of the intestinal excretions. The period during which most material is washed into the tanks and other bodies of water which, until quite recently, constituted the universal sources of drinking water in Calcutta is that in which the rainfall is greatest and characterised by the greatest heaviness of individual falls. These months are June, July, August, and September; but the first of these is a month of low medium, while the three others are months of minimum prevalence.

With reference to the latter three months, it may be argued that, although the inwash of materials is then great, the inwash of the specific material producing cholera is not so, as it has been in great part removed from the surface of the soil by previous rainfall, and that the influence of what still remains to be introduced is neutralised by the coincident dilution of the sources of drinking water. This argument is, however, quite inapplicable to the phenomena of June. At this time there has been no sufficient previous rainfall to remove the specific material from the soil surface, or to dilute the water-supply; and yet the abundant and violent rainfall of June is accompanied by a great decrease in prevalence. Equally inexplicable on this theory are the phenomena presented by May and November. In May the amount of specific material ready for introduction must be at a maximum, for the preceding months are those in which the number of cases of the disease—the number of assumed factories of the poison—far exceeds that present at any other time of the year. In May, too, both the total rainfall and the heaviness of individual falls are, on an average, higher than in April; and yet at this very time, when everything, according to the theory, provides for excessive increase in prevalence, there is, on the contrary, a marked decrease. We have here an instance of decrease where the theory requires increase, and the phenomena of November furnish an example of an exactly opposite nature—of meteorological conditions which, according to the water theory, ought to ensure decrease, but which, in fact, coincide with marked increase. When we compare the rainfall of November with that of October, we find that, in so far as provision of means securing inwash of materials are concerned, the latter month occupies a much higher place than the former; and yet the virtually rainless November shows a great increase in prevalence when compared with October.

3rd.—The theory which regards the degree of impurity of the drinking water as the essential determinant of the prevalence of cholera. According to this theory, the periodic fluctuations in the prevalence of cholera in a locality in which the disease is endemic are dependent on corresponding variations in the degree of impurity of the water-supply. In so far as the general physical conditions of locality are concerned, the degree of impurity of the water must depend on the degree to which the entrance of extraneous impurities is facilitated, and on influences determining the relative proportions of the impurities to the mass of water containing them. The conditions favouring the entrance of foreign matters in general into the sources of water-supply are precisely those described previously as favouring the entrance of specific materials; and the conditions favouring concentration of impurity are those under which the general mass of water is reduced to least bulk. Consequently, according to this theory, the maximum prevalence of cholera in Calcutta ought to occur during the hot and dry season, when concentration attains a maximum, and during the commencement of the rains, when there is great inwash of extraneous impurities, without an increase in the mass of the water calculated to do more than neutralise this addition.

The phenomena presented by the cholera prevalence of the hot and dry months, at first sight, appear to afford strong confirmatory evidence to the theory; for the season of maximum prevalence occurs then, coincidently with the season of lowest water-level. When, however, the phenomena of individual months of the hot and dry season are examined, the results are not so favourable to it. In May the water-level reaches its lowest, the conditions affecting evaporation being, apparently, more than sufficient to neutralise the effect of the slight excess in the rainfall over that of April. In May, then, the sources of water-supply are reduced to their smallest bulk, and the concentration of the impurities in them reaches a maximum; and consequently, according to the theory, the cholera prevalence of the hot and dry season ought to come to a climax then. On the contrary, however, the prevalence in May is much less than in either of the preceding months.

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The phenomena of June do not show any closer agreement with the requirements of the theory. At this time, according to the theory, cholera prevalence ought to continue at a maximum; for, although the mass of water in the sources of water-supply undergoes considerable increase, the conditions of rainfall are such as to ensure great inwash of materials from the soil, which has not been purified by any great previous rainfall. June is, however, a month of low medium, not of maximum prevalence. November, also, presents great difficulties to the acceptation of any such explanation of the phenomena of periodic fluctuations in prevalence. In November conditions facilitating inwash of extraneous materials are at a minimum, and the mass of water is greater than in either June or July. The prevalence in November ought, therefore, to be lower than that in June and July; but, on the contrary, it is very much higher than in these months.

4th.—The "soil" theory. The theories which have been considered hitherto assume that the nature of the specific cause of cholera, or, at all events, that the conditions determining the production of the specific cause, are already definitely ascertained. The soil theory, however, does not go so far; and the difficulty of determining the bearing of our data upon it is proportionately enhanced thereby. All that it definitely affirms is that the specific cause of cholera is developed in the layer of soil lying above the water-level or first impermeable stratum in a locality; and that, therefore, the development must depend on certain conditions of that layer. These conditions are, admittedly, quite undetermined, but must be supposed to be constantly existent, in greater or less degree, within the areas in which the disease is endemic. According to it, fluctuation in prevalence in any endemic locality must be dependent on corresponding fluctuations either in conditions affecting the development of the poison in the soil, or on conditions determining its diffusion from the soil.

So long as the conditions supposed to secure development of the poison are not distinctly defined, it is evident that an endemic locality affords little field for testing the theory in regard to the relation of prevalence of the disease to influences calculated to favour its production. Attention must, therefore, be mainly directed to prevalence regarded as dependent on diffusion; but even regarding questions of production, there are certain phenomena of prevalence which admit of comparison with the theory. In any locality, like Calcutta, where the layer of soil above the water-level is always of comparatively little depth, and of tolerably uniform structure throughout, the theory may be supposed to assume that, other things being equal, the amount of the specific material developed ought to increase with the mass of generating stratum. From this point of view, the maximum and minimum of prevalence ought to coincide with the maximum and minimum depression of the water-level, which is very much what we have previously ascertained to occur in reality.

In proceeding to consider cholera prevalence as an expression of the degree of diffusion of the poison, it must be borne in mind that there are two main channels by which materials developed in the soil may reach the human beings in any locality. These are the water and the air occupying the interspaces between the solid constituents of the soil. If the water of the soil be regarded as the means of diffusion of the poison, the phenomena of prevalence in Calcutta present the same difficulties to this theory as they do to those previously considered. This, however, is not the case if the air be regarded as the channel traversed by the poison in passing from the soil to the subjects of the disease. On this hypothesis, maximum and minimum of prevalence ought to coincide with maximum and minimum of soil ventilation. According to our data, the maximum of soil ventilation occurs during March and April, coincidently with the maximum of prevalence; and minimum soil ventilation occurs during the rainy season, the period of minimum prevalence. So far, however, as diffusion alone is regarded as determining prevalence, the phenomena of prevalence in Calcutta do not coincide accurately with the requirements of the theory. The depression of prevalence in December and January, and again in May, remains inexplicable; and all that can be positively affirmed is that the difficulties opposed by the phenomena of periodic fluctuation in the prevalence of cholera in Calcutta to the soil theory are less than those encountered by any of the other current doctrines regarding the essential cause of the disease.

The foregoing remarks apply with equal force to the relation which various physical conditions bear to the prevalence of cholera in the other districts of the Bengal Presidency in which the disease may be said to be endemic. In the stations which have been selected to represent the principal districts of the endemic area taken as a group the seasonal manifestation of the disease presents a striking resemblance to that in Calcutta—82 per cent. of the total annual cholera taking place during the eight drier months of the year in Calcutta, and 71·2 in the stations taken as a group, the maximum cholera in both occurring during the comparatively dry months of March and April.

As, however, the figures available regarding the prevalence of the disease at the individual stations of this group are so small compared with the statistics of Calcutta, which embrace the general population, it is not to be expected that the monthly proportions should accurately

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agree. Notwithstanding this, however, and the difference in the surroundings of the classes of the population compared, even the monthly statistics, especially when weeded of manifestly casual occurrences, present a marked general similarity. It is therefore obvious that the conclusions derived from the data regarding Calcutta apply generally to this group of stations also.

Seeing, however, that in those parts of the Bengal Presidency in which cholera manifests itself at irregular intervals only it displays a preference for other than the dry months of the year, it will be necessary to consider whether the foregoing remarks concerning the more prominent doctrines regarding the causation of the disease still retain their applicability.

(1.) With regard to the theory of direct contagion, it was observed that the fact that cholera prevalence in the endemic area was at a minimum when, for climatic reasons, the people (during the rainy and cold seasons) are most crowded together tended to negative the view that personal contact exercised any important element in the extension of the disease.

In the Upper Provinces, notwithstanding the still closer relation which must exist between individuals owing to the greater severity of the cold, cholera falls to its minimum degree of prevalence at the period of minimum temperature, and a sudden diminution from the maximum prevalence of cholera takes place contemporaneously with the setting in of the colder weather. On the other hand, close association of individuals must also be favoured by the crowding incident on the conditions of the rainy months of the year when cholera is most apt to occur. As, however, the heavier and more continuous rainfall of Lower Bengal, with the corresponding increased crowding together of the people, is contemporaneous with a marked diminution of the disease, the general weight of evidence remains opposed to the doctrine of direct contagion.

(2.) Assuming the water-level registers to give a fair general indication of the fluctuation of the water used for domestic purposes in the different stations where observations were conducted, the theory of the spread of the disease through the medium of drinking water gains greater support in the non-endemic area than in Lower Bengal. A glimpse at the diagrams representing the variation in the water-level of different localities in this area will show that the disease undoubtedly attains its maximum shortly after the level of the water in the wells begins to rise; hence, it might be inferred, when sufficient time has elapsed for the choleraic material dispersed over the soil to find its way by percolation into the wells, and when the water, being low, favours the swallowing of the *materies morbi* in a concentrated form. To this, however, it must be added that a considerable proportion of the cholera of a station occurs before the water-level in the wells is affected, especially in some stations where the wells are very deep and where the total annual fluctuation does not exceed a few inches. In such cases it must be assumed, either that the cause of cholera was present in the water before the percolated impurities could reach the well, or that the earlier cholera of the season was derived from some other source than that furnishing the later cases. With regard to the production of the 'spring' cholera, again, it can hardly be attributed to the percolation of choleraic impurities into the wells; for the ground appears to absorb all the rain that falls at this time, and in scarcely any of the selected stations in the non-endemic area is it observable that the level of the well-water is materially affected by this season's rainfall.

It may, of course, be maintained that, while all cases of cholera are not to be referred to the effects of the *percolation* of cholera impurities into sources of drinking water, those phenomena which cannot be accounted for in this way are ascribable to the effects of the *direct introduction* of the materials into the water, or other ingesta. But before this can be accepted as a satisfactory explanation of the phenomena, it must be shown that the facilities of introduction at different seasons and in different years vary proportionately to the coincident prevalence of cholera. Until this has been done, the theory seems to assume that every year in which cholera is generally epidemic is at the same time a year in which there is an epidemic tendency to the direct introduction of choleraic materials into sources of water-supply.

The streams and rivers must, however, receive a considerable amount of surface impurities by every fall of rain; and if it were true, as some advocates of the 'water-theory' maintain, that an infinitesimal quantity of a choleraic discharge finding its way into a river can multiply to such an extent as to be capable of infecting the population of an entire city, a rapid and general diffusion of cholera would be readily accounted for. If this were actually the case, however, it should follow that the progress of cholera along the water-courses and in the direction of the current would be evident to all. In that case any outbreak of cholera which might occur in the earlier part of the year towards the north-west of the area under consideration ought to be traceable week by week along the line of the streams and rivers which flow into the Ganges in the North-West Provinces, Oude, Behar, and so on, in a direction towards the sea; but experience shows that, so far as the disease can be tracked in

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any definite direction—that is to say, so far as the circumstance that the months of maximum cholera prevalence present a certain ill-defined, progressive arrangement along the stations in the Gangetic plain can be taken as indicative of the "direction" taken by the disease—this direction is precisely the reverse of that followed by the numerous streams and rivers: cholera attains its maximum in March and April towards the mouths of the Ganges, but not till August at its sources.

(3.) In so far as the endemic area is concerned, there can be no doubt that the soil theory is more in accordance with the phenomena of the seasonal prevalence of cholera than any of the other theories previously considered. In regard to Upper India the evidence is as yet defective, and detailed data are wanting on many points. There are, however, certain important facts pointing very distinctly to the importance of local soil-conditions in relation to cholera prevalence in this area also.

It was remarked in one of the earlier chapters of this paper that, the nearer the soil of a district in India approaches in character that constituting the lower portion of the Gangetic plains, the greater is the likelihood that cholera will be found as an endemic disease in it. It has been seen that the seasonal manifestation of cholera changes gradually as we proceed up the river, the disease manifesting a tendency to be deferred later and later in the year the farther the affluents of the Ganges are followed towards their sources, and the drier the climate and the soil become, so that in the upper part of India and in the Central Provinces the maximum prevalence of the disease occurs just at those periods when the soil-conditions most closely approach those in Calcutta when in its driest state, *viz.*, during and towards the end of the rains, at which period alone the soil-conditions of the former area approximate to those of Lower Bengal during the greater portion of the year. After bestowing the most careful consideration on this matter, and after endeavouring to examine it in all its phases, we have come to the conclusion that the theory which regards conditions of the soil as essentially determining the production of the cause of cholera in a locality is much more in accordance with the phenomena of its seasonal prevalence as manifested throughout the Bengal Presidency than any of the other doctrines appear to be.

In manifesting a marked partiality for a soil of the character of the Gangetic alluvium, cholera is by no means singular, for it is a well established fact that malarious fevers and kindred diseases flourish with most vigour about the deltas of large rivers all over the world.

The connection between soil and malaria, as a connection implying cause and effect, is not seriously questioned, and the apparently capricious manner in which some districts evolve it and others do not is a well-recognised fact: swampy and arid soils alike being capable of producing the miasm during certain seasons.

In this malaria presents a considerable resemblance to cholera, for, although both affections manifest a marked tendency to become endemic in alluvial districts, there exist, nevertheless, very numerous localities, even in tropical and subtropical climates, where both affections are unknown, such for example as the extensive swampy districts in South Australia. That cholera also is unknown there is commonly attributed to the circumstance that India is too far removed to allow of the transport of infectious material, but no one has as yet attempted to explain the absence of malaria on such grounds.

We would not, however, be understood to imply that the causes productive of malarious fevers and cholera are identical, or that localities providing the conditions necessary for the development of the one must, therefore, provide those for the other also.

There are malarious localities of the most pronounced type where cholera has never flourished notwithstanding that cases of the affection have been brought there, and fatal cases too. Of these probably no better example could be cited than the large convict settlement at the Andaman Islands, where cholera has never thriven, notwithstanding the fact that it is within three days of India and 24 to 36 hours of Burma, and that during the last twenty years steamers have constantly passed between the two countries and the settlement. A steamer laden with convicts proceeds to Port Blair (the only port in the islands) from Calcutta every four weeks, and cholera cases have on some occasions been imported and have died after landing; but it is only on rare occasions that cases of cholera have been registered as occurring in any part of the settlement.

That, in the present state of our knowledge of the subject, it may appear difficult or impossible to explain all the phenomena of the distribution of cholera by coincident conditions of the soil must be at once allowed. But at the same time, when we come to inquire into the point, we find that just as many difficulties present themselves in reference to malarial affections. Whilst generally associated with moisture of air and soil, they also occur in certain localities which might have been regarded as quite incapable of furnishing the conditions for their production. In some of these cases, such as the oases in the Sahara, the unfitness may be only apparent, and, on closer inquiry, conditions may be demonstrated

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calculated to produce the result. In others, however, no satisfactory explanation can be afforded. The telluric origin of the cause producing the symptoms of malarial poisoning is not, however, on this account doubted, and if this be so, there is no sufficient reason for doubting the telluric origin of the cause of cholera in similar exceptional cases.

Not only do we observe marked parallelisms between cholera and malaria in the capriciousness manifested by the apparently very opposite conditions of soil in which the diseases are sometimes observed, but also in the manner of their diffusion. It is a matter of common experience that removal from a locality in which cholera exists is a remedy against the spreading of the disease, and the Government of this country has for many years past acted on this knowledge with regard to its troops and prisoners with the greatest benefit. It is equally a matter of experience to find the population of one part of a district suffering severely from fever, whereas others are practically exempt, without any very evident difference in the localities being observable; and, just as in the case of an outbreak of cholera, how often has it not been observed that crossing to the other side of a river, or shifting a ship a few hundred yards from where it has been at anchor, has sufficed to put an end to a regular epidemic of malarious affections? With regard to both affections tracts of country which suffer in one season are exempted in the next, whilst districts formerly exempted are in their turn attacked: at the same time, the two diseases manifest a decided predilection to attack some localities at all seasons.

It is not uncommon to find that cholera is described as passing over large tracts of country, either with the wind or in its teeth, according to the particular views entertained by the writer, leaving the impression on the mind of the reader that some pernicious influence had passed over the land. But is it not a fact that cholera, instead of spreading itself over the country on any systematic, geographical plan, often appears simultaneously in districts perhaps a thousand miles apart? Does it not seem more reasonable to infer that the disease was generated at or near the place of its occurrence in the same manner as outbursts of malarious fevers?

There is nothing more remarkable in the production of an attack of cholera than in the production of an attack of ague: in some respects, indeed, the latter is the more remarkable of the two, seeing that once acquired the symptoms may recur at long periods after the original attack, and without subsequent exposure to the influences that originally produced it. It is true that, although malarious fevers are not so appallingly fatal as cholera, nevertheless it has not been always so. During periods when cholera was either unknown in Europe or a far milder form alone of it prevailed, malarial fevers almost depopulated whole tracts of country—many parts of England suffered terribly, and Sir Gilbert Blane states that the mortality in London from ague during 1558 was so great that the living could not bury the dead.

We would not for a moment have it supposed that we consider the two affections as mere gradations of the same disease; all that we desire to urge is that cholera has as good a claim as malarial diseases to a telluric origin. What the essential cause may be remains unknown in both cases; but the fact that the production of malaria is so greatly under the control of improvements in local conditions warrants us in looking confidently for similar results with regard to the cause of cholera also.

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ABSTRACT OF REPORT OF THE SANITARY COMMISSIONER FOR MADRAS FOR 1876.

(Surgeon-Major W. R. Cornish.)

European Troops.

Sickness and mortality among European troops.

The year 1876 was not generally an unhealthy period for Europeans in Southern India. The death-rate was enhanced by outbreaks of cholera in Madras, Secunderabad, and Wellington, by typhoid fever in Secunderabad and Wellington, and by heat apoplexy at Kamptee and Trichinopoly.

The ratio of hospital admissions for the whole of the British army was 1,133·26 per 1,000; of daily sick 55·31; of deaths in hospital 14·50; of deaths out of hospital or without medical treatment 1·57. The total ratio of mortality from all causes was 16·07.

The following table shows the principal causes of death in the British army in 1876, compared with the results of the seven previous years :—

Years.	Strength.	Small-pox.	Typhoid Fever.	Continued Fever.	Intermittent Fever.	Remittent Fever.	Cholera.	Phthisis Pulmonalis.	Sunstroke and Heat Apoplexy.	Heart Diseases.	Respiratory Diseases.	Dysentery.	Diarrhœa.	Hepatic Diseases.	Venereal Diseases.	Delirium Tremens.	Violence and Accidents.	Other Diseases.	Total.
1869 - - -	10,277	3	10	3	—	11	27	9	17	13	7	16	9	54	2	10	19	29	239
1870 - - -	10,733	—	14	1	—	7	39	10	5	19	7	23	—	35	2	3	18	29	212
1871 - - -	10,684	—	15	4	—	6	36	11	3	19	10	20	—	36	1	6	21	17	205
1872 - - -	11,244	2	26	5	—	3	2	17	18	22	2	27	2	41	3	4	14	28	216
1873 - - -	11,341	1	10	3	—	4	14	9	9	24	6	33	1	56	1	1	24	14	210
1874 - - -	11,343	1	12	2	—	—	1	13	6	14	6	12	—	45	2	1	15	22	152
1875 - - -	11,005	—	7	2	—	2	4	13	5	22	4	16	1	37	5	3	23	19	163
Mean of 7 years - -	10,947	1	13	3	—	5	18	12	9	19	6	21	2	43	2	4	19	23	200
1876 - - -	10,823	—	21	5	—	1	17	9	20	14	5	17	1	27	1	2	19	15	174

It will be seen that the mortality, on the whole, has been below the average of the previous seven years, and that the only excess has been in regard to "fevers" and "heat apoplexy."

Fever.

Enteric or typhoid fever was not generally prevalent in 1876. No cases are reported from Bangalore, which station has, of late years, been rather notorious for the number of cases; but 85 cases of "continued fever" and three deaths appear in the Bangalore returns. Altogether there are 48 cases of enteric fever recorded, 38 of which occurred at Secunderabad, five at Wellington, two at Bellary, two at St. Thomas' Mount, and one at Thayetmyo. Of the 48 cases, 19 died: 14 of these at Secunderabad, three at Wellington, one at St. Thomas' Mount, and one at Thayetmyo.

Regarding enteric fever at Secunderabad, two cases occurred in Her Majesty's 16th Lancers, one early in the year; seven fatal cases in Her Majesty's 2nd Battery 16th Brigade, a newly arrived corps, five of which occurred in the third quarter; and four in Her Majesty's 44th Regiment, three at the same time of the year.

Cholera.

The year 1876 was one of very general cholera diffusion throughout the Presidency, and in many military stations the disease was present for long periods together. At Secunderabad, for instance, it prevailed nearly the whole year through in the adjacent towns and native bazaars, and the same might be said of Madras. It is a matter, therefore, of congratulation that so few cases of this disorder occurred amongst the British troops. There were in all 33 cases and 15 deaths. Of the cholera attacks, nine occurred in the town of Madras, three at Bellary, one at Poonamallee, seven at Secunderabad, and 13 at Wellington.

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With regard to the outbreak at Wellington, a station in the Nilgherries, 6,000 feet above sea-level, it was almost entirely confined to a party which reached the station on the 1st April, having cholera in their midst. It seems that some convalescents of Her Majesty's 33rd Regiment from Bombay, with details from Secunderabad and Bellary, met at the Arconum railway station on the 31st March, and proceeded together in the train to Mettapolliem. On the way, and in the railway carriage, two men of the Bombay party were seized by cholera, and one of these died in a cart on his way to Wellington, the other man being carried into the cholera camp provided by the local authorities for the reception of the party. The following day three men and a child were seized. Up to the 7th April there were 11 admissions from this party. These people were not allowed into barracks until the 20th May.

In the third week in April, the medical officer of Wellington records a case of malignant cholera (a woman) from No. 4 married soldiers' block.

In the seventh week of the quarter (May) a private of H.M.'s 89th Regiment, who had been engaged in looking after the sanitation of the cantonment, was admitted with severe cholera symptoms. He rapidly recovered. This was the last case at Wellington.

The cholera cases at Madras and Secunderabad did not occur in number and frequency so as to entail evacuation of barracks. In Madras the first case occurred in April, but in Secunderabad cases occurred in January, February, April, August, and September.

Small-pox.

In the whole European army (average strength 10,897) there was a single case of small-pox, which recovered. The condition of the European troops in regard to small-pox shows that they were well protected by vaccination.

Venereal disease.

The total admissions from venereal causes were 1,906, or in the ratio of 177·9 per 1,000 of strength. The highest ratios were in Bellary (283·8), Kamptee (286·0), Madras (270·4), Secunderabad (211·4), and Seetabuldee (320·0). All these are "protected" stations. The smallest proportion of venereal admissions occurred at Malliapooram (32·2 per 1,000); Port Blair (52·2); Trichinopoly (78·6); and Cannanore (99·1); the two former being "unprotected," the two latter "protected" stations.

The proportion of admissions from venereal causes has not been quite so high as in the former year, as will appear from the marginal abstract of ratios for the past five years. In the town of Madras the ratio of admissions appears to be increasing, and the operation of the "Contagious Diseases' Act" does not seem to exercise any long continued and permanently useful influence over this particular class of maladies.

1871 - -	173·8
1872 - -	160·0
1873 - -	149·8
1874 - -	187·4
1875 - -	204·8
1876 - -	177·9

The truth is that special legislation, unless it be supported by the classes for whom the laws are made, is never satisfactory in its results. The regulations for the control of diseased women are comprehensive, but they can be evaded, and always will be evaded until the military recognise the importance of being their own police in regard to this particular subject.

Invaliding.

The proportion of invaliding in the British army in 1876 was unusually high, and especially for change of climate. The ratio of invaliding to strength varies a good deal in different years, so that no safe deductions can be made as to the influence of climate, or local causes, on the invaliding of a single season. In 1876 the numbers invalided "for discharge" were 122, or 11·2 per 1,000 of the mean strength, and of those sent away for "change of climate" 356, or 32·8 per 1,000 of strength.

Of a total of 478 men sent away, 102 were suffering from weakness or debility only, 79 from hepatic diseases, 56 from dysentery, 42 from phthisis, 34 from heart disease, and 30 from venereal diseases.

Native Troops.

Sickness and mortality in Madras Native Army.

The native troops within the Madras command only are entered in the medical returns received in my office.

According to these returns the average yearly strength of the troops in the Madras command was 26,418. The hospital admissions were 19,202, average daily sick 746·60, and total deaths 292, of which 33 occurred out of hospital. As there were 375 deaths in the whole army, there remain to be accounted for 83 deaths in the Madras troops employed in Bengal.

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The ratios of sickness and mortality per 1,000 of strength (according to Adjutant General's return) in 1876 are compared below with those of the preceding year :—

	1875.	1876.
Admissions - - -	777·7	726·8
Daily sick - - - -	30·7	28·2
Deaths - - - -	12·0	13·1
Invalided - - - -	39·3	37·1

In all there were 48 cases of small-pox with only one death, a result which speaks very favourably for the condition of the regiments in regard to vaccination. Of cholera there were 89 cases and 46 deaths, the largest number of cases occurring in Madras, Palamcottah, Trichinopoly, and Secunderabad. Fevers of an intermittent character accounted for 6,711 admissions, or more than one-third of the whole. The total of admissions and deaths from all varieties of fevers were 7,403 and 54 respectively.

Jails.

Sickness and mortality in jails.

For the latter part of the year the jails were generally overcrowded, and temporary accommodation had to be devised to meet the influx.

The year was an unhealthy one as regards cholera, and the pressure of scarcity and famine sent a great number of ill-nourished persons into jail. The mortality was higher than in any season since 1867. The chief causes of the increase of mortality were cholera, bowel-complaints, and diseases of innutrition. The ratio of deaths per 1,000 of strength was 42·49 ; in central jails it was only 29·0, while it was 54·4 in district jails. The ratio of sickness was also in excess in the latter, which were more overcrowded, and not so well protected from epidemic diseases.

In Cannanore and Coimbatore central jails mortality was higher than usual; and in the following district jails the death ratio was very high, due in some cases to cholera epidemics: Calicut (111 per 1,000), Coimbatore (97), Kurnool (143), Madura (93), Tanjore (117), Tranquebar (56), Vizagapatam (107).

Cholera prevailed but very slightly in the central jails. In Vellore, Rajahmundry, and Cannanore no cases at all occurred. In Coimbatore there were nine cases and four deaths, and in Trichinopoly and Salem three cases in each.

In the district jails cases of cholera occurred in 17 out of 26 jails. The disease prevailed epidemically in Madras Penitentiary (10 cases), Madura (47 cases), Chittoor (33 cases), Kurnool (50 cases), Calicut (10 cases), Tranquebar (10 cases), Trichinopoly (8 cases). In all the jails there were 222 cases of cholera and 108 deaths. In the Madura, Kurnool, and Chittoor jails, where the epidemic chiefly prevailed, there was much overcrowding.

General Population.

Effects of the famine on health.

The history of the famine does not fall to be noticed in the records of 1876, but the deficient rainfall in the two years 1875 and 1876 in certain tracts of country showed most clearly that famine must be an inevitable consequence of the prolonged drought; while the mean rainfall of five years ending 1874 in 222 registering stations was 47·87 inches, extending over 62 days, the rainfall in 1875 was only 37·26 inches in 56 days, and in 1876 the mean registration was only 27·81 inches in 42 days.

But in some portions of the Presidency the deficiency in rainfall was more marked than in others; for instance, in Bellary, Kurnool, Cuddapah, Nellore, and Chingleput districts, where a scanty fall in 1875 was followed by an almost total absence of rain in the usual season in 1876.

The districts in the west and centre of the peninsula of India get their principal rain supply in the south-west monsoon. This monsoon was much lighter than usual in South Canara, Malabar, and Nilgherries.

In the districts of Ganjam, Vizagapatam, and Godavery, to the north of the Presidency, the falling off in rainfall was not so marked, and agricultural production was not hindered, but the Kistna district received only one-half its average rain, and the dry parts of the district, away from the influences of the canal irrigation in the delta, suffered much. The districts of Madura and Tinnevelly in the south have suffered less from the scanty rainfall than those of Coimbatore, Salem, and North Arcot. Tanjore, Trichinopoly, and part of South Arcot

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are watered by the Cauvery river, and, as regards wet cultivation, are to some extent independent of local rainfall. The latter districts have not felt the pressure of scarcity, and have exported food-grains to other districts. But even where food-grains have been grown in abundance, the demands of other districts have caused a great rise in value, and the poor have naturally suffered in consequence.

The grains most commonly used by five-sixths of the people of Southern India are cholum (*Sorghum vulgare*) and ragi (*Eleusine coracana*). It is the practice of the better classes of the ryots to store these grains in under-ground pits, and in ordinary seasons considerable reserves of grain are kept in the villages. The pits are excavated to a depth of 10 or 12 feet, the sides and roof well lined with "wattle and daub" and straw, and, if properly made to exclude air and moisture, the grain will keep good for years. Pits are usually made to hold about 10,000 seers of grain each, and for security, they are generally made under the main streets of the villages.

Owing to this practice of storing the dry millets, it is always a most difficult thing for Government officials to estimate the stocks in reserve. There can be no doubt of the fact that, wherever the population depends largely on the dry cereals, the quantity of reserved grain must be large, for it is not the habit or custom of the people to eat these grains until they have been from one to four or five years in store. I have been informed that stored grain will keep perfectly sweet and fit for food for twenty years.

Grain pits are liable to accidents. If moisture or air get in the grain becomes eaten by weevil and destroyed by fungoid growths. In unusual rains wet may get in and destroy the hoard, and I am informed that the heavy rainfall of 1874 destroyed many grain pits in Mysore and Bellary. In opening these pits great care is necessary, as men have frequently been asphyxiated by the accumulation of carbonic acid gas in them.

If we take Bellary as a sample of a district in which dry grain is almost exclusively consumed, we see that in January 1875 cholum sold at 32·6 seers the rupee, and that the price rose pretty steadily all through that year until January 1876, when 26·1 seers were sold for the rupee. In September of the same year the price rose to 15·5 seers the rupee, and in December only 7·5 seers could be got for the same money.

Then again with ragi, this most excellent and nutritious cereal was sold in Bellary in January 1875 at an average rate of 35·4 seers, or about 71 lbs. avoirdupois, for a rupee. In December 1876 the price had advanced so as to give only 15½ lbs. or 7·9 seers for a rupee. In other words, the quantity of grain obtainable for 1 rupee in January 1875 could not be got for less than 4½ rupees in December 1876.

In the districts in which the rains were not specially deficient, as in Godavery or Ganjam, prices rose very rapidly during the latter months of 1876.

The prices of all kinds of food, besides grains and pulses, went up alarmingly high towards the end of the year. Oil, ghee, ground-nuts, sugar, fowls, mutton, milk, butter, and vegetables have all undergone a corresponding rise. The only cheap food of an animal kind has been *beef*, and this has been cheap solely on account of the mortality amongst cattle and the deficient supplies of fodder to keep them alive. The cheap animal food during the early months of the famine was of an enormous value and importance in maintaining the health of the labouring classes; but for this aid, disastrous consequences of the deficient food supply would have shown much sooner than they actually did. Large numbers of the lower classes have no caste scruples about eating beef.

Vital statistics.

The population for which returns of births and deaths have been received was 29,157,056. This does not embrace the total population as ascertained by the census of 1871, which was 31,597,872.

The large zemindary estates in the Madura district have not made any returns of births and deaths this year, and the other populations omitted belong chiefly to the hill tribes of Ganjam and Vizagapatam.

The total number of births registered was 632,113, being at the rate of 21·6 per 1,000. The comparison with three preceding years is as follows :—

	Per 1,000.
1873	17·7
1874	19·1
1875	21·1
1876	21·6

The birth registration in the rural districts is still very defective, and on the whole it does not seem probable that more than two-thirds of the births are recorded. In municipal towns

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(total population 1,600,044) the births are better registered, and the following figures show a much nearer approach to the true birth-rate of the Indian people:—

	Per 1,000.
1873	25·5
1874	29·9
1875	28·3
1876	27·6

The largest number of deaths in any year from 1866, when registration was begun, has been registered in 1876.

The following table shows the registration for each year and the principal causes of death:—

Years.	Total Deaths.	Cholera.	Small-pox.	Fevers.	Bowel Complaints.	Other Causes.
1866	600,106	200,961	23,106	110,102	—	265,937
1867	372,026	33,205	27,907	112,511	—	198,403
1868	390,959	8,036	34,330	105,692	—	242,901
1869	451,981	21,034	17,448	132,346	—	281,153
1870	451,020	55,867	11,252	151,027	—	232,874
1871	444,371	17,656	20,823	192,469	38,928	174,495
1872	508,182	13,247	39,074	214,148	39,387	202,326
1873	513,232	840	51,784	222,843	36,392	201,375
1874	521,329	313	48,343	226,220	37,993	208,460
1875	641,260	94,546	24,775	252,042	37,484	232,413
1876	680,384	148,193	23,469	230,092	38,176	240,454

For the whole population the registered deaths were in the proportion of 23·3 per 1,000.

In certain of the districts which had already begun to suffer from the pressure of the famine in 1876 the registered mortality was unusually high.

Epidemic cholera has been more fatal in 1876 than in any year since 1866. In both of these years there was failure to some extent of the ordinary monsoon rains, and scarcity of food, high prices, and actual famine in certain localities.

As regards seasonal causes of mortality, it is invariably the case that the cold season is the one in which the deaths are most numerous. As a rule, mortality begins to decline with the setting in of the hot dry season, rises again with the moisture of the south-west monsoon, declines somewhat at the end of the monsoon in October, and obtains its maximum in the cold weather months of November, December, and January. This has been the course of the death registration in 1876, but the most remarkable variation has been the sudden rise in mortality at the end of the year.

Cholera.

The Sanitary Report for 1875 showed that in the month of April of that year cholera began to be epidemic in the district of Tanjore, and, before the year was out, had spread throughout Southern India, and so far north as the Kistna district, causing a total mortality of 94,657 deaths.

In the beginning of 1876 cholera prevailed in almost every district. It declined in the hot and dry months, increased again in July, and fell to a minimum in October. In November and December the deaths rapidly increased.

The year 1876 must be regarded as the second year of a new invasion of epidemic cholera. Our experience shows that these invading epidemics usually go on by recrudescence for three or four years from the time of invasion. In this second year of its progress, cholera has no doubt been aggravated by the abnormal seasons and general scarcity of food, and in some degree also by the aggregation of the people on famine relief works.

A local outbreak of cholera in a village of the Salem district formed the subject of a special investigation by the Acting Sanitary Commissioner. The following is Dr. King's report:—

"This small village (Kanakkampatty) of forty-eight houses and 202 inhabitants, according "to the census of 1871, acquired an undesirable notoriety in February last by an outbreak "of cholera of extreme severity. Fifty-six deaths occurred in five days. The survivors "fled, leaving unburied corpses in the lanes and houses, and carrying the disease to other "villages. The circumstances having been brought to the notice of Government, the Acting "Sanitary Commissioner was directed to make a thorough investigation.

"The village consists of a group of huts, placed without any attempt at regularity, and "separated by very narrow tortuous lanes, and small yards in which cattle are kept.

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" * * * The disease was introduced by a man who, coming from the Darampuri taluq " to a wedding, spent the night before his arrival in a cholera-infected village. He was " taken ill in Kanakkampatty, but recovered. The next attacked was a girl, an inmate of " the house in which the wedding was taking place. She also recovered, but never left the " premises while her illness lasted. Those who believe that the disease is propagated by " the excreta of patients will not be surprised to hear that ten other inmates of this house " died of cholera.

" The extreme virulence of the epidemic remains to be explained; and inquiry into the " water supply of the village disclosed the cause at once. There is no water in the village " itself, which is built on high ground; and the only source of supply, for all purposes, is a " small ghuntah, not more than thirty feet square, about a hundred yards away and con- " siderably lower down. Between this and the village is a field which, no doubt, receives a " fair proportion of the excreta of the inhabitants, and the surface drainage of which flows " without impediment into the ghuntah. It was a matter of course that water thus polluted " should be found, on chemical analysis, unfit for drinking, and that its use would pre-dispose " to the reception of cholera poison; but this was not enough. While the villagers continued " to use this water, and this only, for drinking and cooking, clothing, including that of those " who were affected with cholera, was washed in the ghuntah. * * * There could be no " more effectual means of spreading the disease most widely in its severest form.

" There is nothing unhealthy in the site on which the village stands. The ghuntah was " condemned, and further use of its water forbidden. Water is now taken—by all, I was " informed—from a large well about 200 yards away."

In regard to water-supply, the country has been badly off as a whole, some districts being better than others. In the town of Madras, for instance, the reservoir at the Red Hills fell so low that the water not only became foul and bad in itself, but the quantity fell short, and many of the population had to resort to other sources of supply. In the famine districts, moreover, the water-supply was almost invariably scanty and bad, and when thousands of dirty people were collected on road works, and the wells few and far between, it is no matter of surprise that the sources of supply became polluted, so as to be active factors in the propagation of cholera.

Small-pox.

Small-pox carried off 23,469 persons, of whom 12,464 were males, and 11,005 females. In some districts the disease was more fatal than in others, as in Ganjam, where 2·5 per 1,000 of the population died from this cause.

Towards the end of the year small-pox showed a great tendency to become epidemic, and one of the effects of famine having been to mass together on road-works large numbers of the villagers of the several districts, its diffusion in this way has been much facilitated.

Fevers.

The mortality from fevers showed a decline, as might be expected in a season of scanty rainfall and unusual dryness of the soil. The number of deaths registered under this head was 230,092.

Bowel complaints.

From bowel complaints 38,176 deaths were recorded. The registration under this head is extremely defective.

It has been ascertained that, through faulty translation into the vernaculars of the term "bowel-complaints," diseases like diarrhœa and dysentery have not in many districts been returned as "bowel-complaints."

Vaccination.

The arrangements for vaccination are now under the control of the Local Fund Boards and Municipal authorities, who entertain and pay the vaccinators, and have these servants entirely at their own disposal. The professional inspection and supervision of the vaccinators however is accomplished by the Inspector of Vaccination (late Superintendent-General), aided by Deputy and Assistant Deputy Inspectors for each Local Fund Circle, and these officers conduct their duties under the direction of the Sanitary Commissioner.

The Vaccine Establishment during the official year 1876–7 consisted of one Inspector, 27 Deputy Inspectors, 10 Assistant Deputy Inspectors, and of 123 First-class Vaccinators, and 282 Second-class Vaccinators. The total number of vaccine operations performed during the year was 483,192, or an increase of 101,780 on the results of the previous year. On the average 94·33 per cent. of the cases operated on were reported as successful.

The means however of controlling or checking small-pox epidemics in this county are far from complete. The operation of vaccination is not obligatory on the people. They are

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still free to choose or reject it, and a great many of them do reject it, while in more numerous instances, the public vaccinator has never been known to visit their villages. This is not altogether the fault of the vaccinators, for the wide areas, and often sparse population allotted to each vaccinator, make it most difficult for him to visit every hamlet or village.

The reports of the Deputy Inspectors do not show that there are grave obstacles to vaccination.

The number of children vaccinated under one year of age was 52,505. The people have a fear of infants undergoing the operation, and usually desire to defer it until the children can run alone.

The system of encouraging vaccinators to work by paying so much per head for the numbers vaccinated above a certain standard is still on its trial. There is no doubt that to be successful the work must be diligently supervised and inspected, otherwise the temptation to send in fictitious figures (the vaccinators being poorly paid) is very great.

Nearly all the Deputy Inspectors urge the introduction of compulsory vaccination as the real remedy for the excuses and objections that are made to the operation. In some districts and localities the time is ripe for the introduction of compulsory vaccination, but not in others.

Sanitary Works.

The following is a summary of facts relating to the sanitary condition of some of the principal stations. Military works.

Trichinopoly.—Conservancy good. Dry-earth system. Public latrines sufficient in number, 5 to every 1,000 of the population; they are kept in good sanitary condition by the municipality. Nothing of importance done during the year. Filling in moats, erection of dust-bins and cinerators, repairing of roads and cleansing of channels, tanks, and wells. A new tank is under construction.

Bangalore.—Drainage improved. Many wells dug and cleaned. Famine relief labour employed for improvement of the station. The Ulsur tank deepened, and embanked on its shallow side. Considerable progress made in the waterworks for the general supply of the native town and cantonment.

Cannanore.—Dry-earth system. Public latrines one to every 1,494 of population. Sanitary state of bazaars satisfactory. Nothing done of importance. Repair of culverts, drains, roads, and dust-bins. Cleaning of wells, planting of trees, and removal of rank vegetation.

Bellary.—Latrines in fair sanitary condition. Dry-earth system of conservancy adopted. There are 11 public latrines, one to every 2,247 inhabitants. Sanitary state of bazaars properly attended to by the municipality.

Secunderabad.—Sanitary condition fair. In two regiments only is the dry-earth system adopted. There are 26 public latrines, one to every 2,000 of population; these are resorted to only by the poorer classes and are kept clean. General conservancy of the bazaars and cantonment attended to. Large number of native huts removed from the cantonment, and the followers' lines re-arranged to admit of easy sanitation.

Kamptee.—Dry-earth system but imperfectly carried out; only one public latrine. Sanitary state of bazaar fair. Several drains were cleaned out and kept in good order. A well for drinking purposes, and three public latrines under construction.

The sanitary progress made in some of the municipal towns is shown in the following brief sketch. Civil works.

Madras.—The sanitary condition of the town during the year was unsatisfactory. The water from the Red Hills was scanty and bad, and unfit for drinking without filtration or boiling. The drainage of the town remained in the condition of former years, aggravated by the fact that the Cooum bar was not once opened, and there was therefore no discharge of the stagnating and diluted sewage to the sea. The main drains emptying direct into the sea were as offensive as ever, and the municipality, being reduced to a condition of chronic impecuniosity, had no means to effect any permanent improvements.

Trichinopoly.—Filling in of the moat, erection of cholera and small-pox sheds. Construction of dust-bins, latrines, drains, cinerators, road-drains, and tunnels. A new well was sunk and a tank was made. Several roads, drains, &c. were repaired and other works of minor importance carried out. Conservancy was well attended to by a regular permanently paid establishment.

Tanjore.—670 yards of side drains, one privy, two conduits, two flights of steps and some other minor works, including the sinking of three new wells, were constructed at a cost

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of Rs. 7,316; several drains, wells, tanks, and ash-tubs, &c. were repaired, and prickly-pear removed. Conservancy was attended to by an establishment of inspectors, scavengers, carts, and watchmen, and during the prevalence of cholera an extra establishment was entertained to keep the town clean.

Bellary.—Much was not done during the year. One double latrine and a few public urinals were built. Conservancy was attended to as usual. The municipality took up the cleansing of the latrines in private houses with immediate benefit to the cleanliness of the town and the comfort of the inhabitants.

Salem.—Latrines in the form of mud-wall enclosures were constructed in lieu of the old ones on the Coimbatore plan. Night-soil pits were dug beyond municipal limits. A dead house was completed, the dispensary compound was levelled, a moat at the back filled up, and the roads gravelled. A portion of channel which always contained stagnant water was cleared and levelled. Two burial grounds were enclosed. All the wells were cleaned and deepened. Many drains were constructed and a few cisterns.

Combaconum.—Two tunnels were built, and a new road was opened out and several streets were widened. Twelve new wells were sunk, two latrines for males and females were constructed, and 26 ash tubs were put up in different parts of the town. The pavements around some of the wells were repaired, the interior of latrines tarred, several roads and tunnels were repaired, and other minor works were executed during the year. Some wet lands in the heart of the town, objectionable on sanitary grounds, were purchased, and cultivation discontinued. Conservancy was carefully attended to by an establishment of inspectors, peons, sweepers, and carts.

Cuddalore.—Two permanent latrines were built, the offal pit in the slaughter-house was removed outside the building, and four new roads were made. Several roads, dust-bins, and the latrines were repaired and kept in good order; three public tanks and a drinking-water well were cleansed. The conservancy of the town is carefully attended to by a special establishment, and the street sweepings are sold as manure. Dry-earth system is adopted as far as possible.

Vellore.—Rs. 8,478 were expended on sanitary works during the year, which consisted in the construction of new tunnels and other miscellaneous works, and in the repair of roads, &c. The sanitary condition of the town was well looked after by the regular conservancy establishment.

Vizagapatam.—Four latrines were built and others are under construction. 475 yards of surface drains were laid, and 25 dust-bins erected. Owing to the failure of rain there was a great scarcity of water, when several wells were sunk and others deepened and cleaned out. The sanitary condition of the town was looked after by the conservancy establishment. During the prevalence of cholera an extra establishment was entertained to keep the town clean.

Adoni.—Several roads and streets were repaired, four masonry tunnels and culverts over side-drains were constructed. Conservancy was carefully attended to by an establishment of an inspector, peons, and carts. While cholera prevailed extra conservancy establishment to keep the place clean was entertained. As famine approached the country people flocked into the town by thousands, overcrowding the houses and streets, and adding much to the difficulty of keeping the town clean.

Berhampore.—Two roads were completed and one was in progress. Six permanent and four temporary latrines were erected. Five tunnels and 70 yards of V-shaped cut stone drains were completed. Several roads were repaired and others were under repair. Two additional conservancy carts were maintained and a swamp was acquired by the municipality, for the drainage of which measures are being taken.

Vizianagram.—2,806 yards of drains and 116 yards of tunnels were constructed, and several pits of stagnant water filled up.

Rajahmundry.—Two new roads and one drain were made, and another drain repaired; several steps were erected. Rs. 436 were spent in constructing and repairing public latrines. 158 dust-bins were placed in different parts of the town, and six dust-carts provided. Prickly-pear and croton plants were removed both from public and private grounds. Great attention is paid to conservancy, which has been improved by increasing the establishment.

Guntoor.—No new works. Some prickly-pear bushes were removed. The roads, drains, latrines, &c. were repaired wherever required and kept clean. The reservoirs of drinking water and wells were protected from pollution. Conservancy was attended to carefully. Dry-earth system adopted as far as possible in the latrines. Sanitary condition of the town was improved to some extent by the prosecution of parties who kept their privies in a filthy condition.

Cuddapah.—One single and two double latrines and one masonry drain with tunnel were constructed. Several latrines were repaired, six streets were widened, three wells were com-

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pletely repaired and others thoroughly cleansed out and deepened, and a new road was under construction. Special attention was paid to conservancy during the year, and the establishment was largely increased.

Chicacole.—Some 250 yards of masonry drains were constructed. Prickly-pear was removed; five latrines, four of mud and one of brick, were built, and a mud-wall enclosure to the cart-stand was erected. Owing to the floods and storms during the year some of the contemplated works had to be postponed. The conservancy of the town is well looked after.

Cochin.—One large and three small drains were built. One large latrine with tile roof was constructed. Several drains and latrines were repaired, and dust-bins placed in convenient parts of the town. Conservancy of the town was properly attended to, the drains were constantly washed and kept clean.

Wallajapett.—Several roads and streets were repaired, and rough stone revetments were built wherever needed. The tanks and wells were cleared and deepened and others repaired. A well was sunk for the use of the slaughter-house. Latrines were kept in good order. Several dust-bins were put up, four culvert drains were constructed, and prickly-pear removed.

Ootacamund.—Reclamation of the lake approaching completion. The Commissioners have resolved to raise a loan of Rs. 20,000, to augment the water-supply. Orders of Government are awaited on this point. Although conservancy was attended to, the bazaars, public thoroughfares, latrines, and roads were kept clean and in good order, and a new system of disposing of the night-soil was introduced, yet the sanitary condition of the town was far from satisfactory, and may be summed up as follows:—

(1.) Imperfect drainage of the native town;
(2.) Improper disposal of sewage;
(3.) Defects in the water-supply channels, they being unprotected from pollution by surface drainage;
(4.) Irregular and unsatisfactory disposition of the native buildings in Mootoocherry;
(5.) The growth of underwood in various parts of the station; and
(6.) Want of sufficient number of wells.

All these defects attracted the attention of the Sanitary Commissioner, who addressed Government on the subject, and a Committee was appointed to report upon and to suggest measures as to how the sanitary condition of Ootacamund may be improved.

Ghooty.—No new works were executed. The drains and latrines were repaired, cleaned out, and kept in good order. Conservancy was as usual looked after, the drinking-water wells were conserved from pollution, and every attention paid to sanitation.

Coonoor.—A new latrine constructed. 20 dilapidated thatched houses were pulled down, and tiled buildings erected instead. Scrub-jungle was removed. Drains were cleansed. Water-courses guarded from pollution, and all hollow places filled in. The existing latrines have been remodelled, and their conservancy carefully attended to. The municipality have taken up the conservancy of some of the private houses also.

Following up the inquiry made in last year's Report as to whether sanitary expenditure has any apparent effect upon health, estimated by mortality, we find that the conclusions arrived at in 1875 are borne out by the results of 1876. Thus, taking 30 per cent. of income as the maximum and 20 per cent. as the minimum of sanitary expenditure, in 12 towns which expended on an average 35·7 per cent. of income for sanitary purposes in 1876 the death-rate was 28·7, and in 12 other towns whose expenditure averaged 15·7 it was 37·7. Eliminating from the calculations cholera, which always forms an unfavourable factor in death ratios, the results are still in favour of the towns whose sanitary expenditure exceeded 30 per cent. of income, the death-rates being 22·5 and 28·4 respectively.

I trust that Municipalities and Local Fund Circles will bear these facts in mind, and show more interest in sanitary works, by making ample provision in their budget estimates for this purpose, and by seeing that the money is usefully and profitably spent in aid of the health and comfort of the community.

I am not in a position to submit any remarks on the condition of, and the progress made in, rural sanitation during the year under review.

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ABSTRACT OF REPORT OF THE SANITARY COMMISSIONER FOR BOMBAY FOR 1876.

(Surgeon-Major T. G. Hewlett.)

European Troops.

Sickness and mortality among European troops.

The strength of the European army as given on particular dates by the Adjutant General somewhat differs, of course, from the average monthly strength which has been deduced from the weekly returns, and for which I am indebted to the Surgeon-General, British Forces. Taking the latter as the basis of our calculations, the rate of admissions into hospital was 1,317·5, and of deaths 12·36 per 1,000 of strength, whilst 540 men were on the average constantly sick in hospital. The fall in the death-rate as compared with the preceding year is most satisfactory. In fact, 1876 was, on the whole, as regards the European army, a healthy year, especially when it is compared with 1875.

The following statement shows the number and principal causes of deaths in the European portion of the army in 1876 :—

Causes of Death.	Number.	Ratio per 1,000.
Injuries	18	1·77
Enteric fever	16	1·58
Heart disease	12	1·19
Respiratory diseases	10	·99
Phthisis pulmonalis	9	·89
Dysentery	6	·59
Suicide	5	·49
Malarial fevers	3	·30
Hepatitis	2	·20
Apoplexy	2	·20
Total of these 10 causes	83	8·20
Total from all causes	125	12·36

The death and invaliding rates were as follows, compared with former years :—

—	Ratio per 1,000.			
	Deaths in and out of Hospital.	Invaliding.		
		For Change.	For Discharge.	Total.
1871	14·02	19·88	10·43	30·26
1872	18·86	33·06	9·40	42·46
1873	11·72	36·14	7·53	43·67
1874	10·64	35·39	9·68	45·07
1875	20·92	35·30	5·27	40·57
1876	12·36	37·27	10·38	47·65

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Only five cases of cholera occurred during the year, two of which ended fatally. One case was at Poona, in September; two at Ahmedabad, in July and September; one at Deesa, in May; and one at Kurrachee, in February. Cholera.

There were 11 admissions for small-pox, none of which were fatal. Small-pox.

Malarial fevers were less prevalent than in any of the previous five years except 1874. In 1871 the ratio of admissions attained the maximum of 692 per 1,000, and in 1874 the minimum of 439. In 1876 it was 480. Fevers.

The stations in which malarial fevers were most prevalent are thus arranged:—

Stations.	Ratio of Admissions per 1,000.
Hyderabad	1,355·5
Bombay	1,103·9
Ahmedabad and Baroda	1,027·9
Neemuch	990·2
Poona and Kirkee	932·1
Mount Aboo	729·7
Ahmednuggur	501·1
Kurrachee	476·4
Deolalee	441·7
Purandhar	416·7
Mhow	401·6
Nusseerabad	382·8

Thirty-eight cases of enteric fever were treated during the year, 16 of which proved fatal.

Apoplexy has been less fatal in 1876 than during any of the previous five years, the death-rate being only ·20. Four cases were treated, two of which ended in death. Apoplexy.

Dysentery and diarrhœa together account for 75 admissions per 1,000 of strength. In 1875 there were 100 per 1,000. The death-rate, ·89, is lower than in 1875, when it reached 1·27 per 1,000. Bowel complaints.

The following stations suffered most severely from these diseases:—Colaba, with an admission-rate of 444 per 1,000 of strength; Khandala, with 263; Baroda, with 169; Indore, with 162; Purandhar and Ahmednuggur, with 125; Nusseerabad, with 112.

From hepatitis 406 admissions, equal to 40·1 per 1,000 of strength, took place, 2 of which proved fatal, the death-rate being equal to ·20 per 1,000. Hepatitis.

The stations where the disease prevailed stood in the following order:—Kirkee, with an admission-rate of 93 per 1,000; Mhow, with 90·2; Indore, with 69·8; Ahmednuggur, with 67 per 1,000.

The annexed table shows the number of admissions from venereal diseases in the last six years among the European troops in the Bombay command:— Venereal disease.

Admissions per 1,000 of Strength.

1871.	1872.	1873.	1874.	1875.	1876.
174	155	181	171	174	179

It is not satisfactory to find, after all the expense incurred by putting the Contagious Diseases Act into force, that venereal diseases should be as prevalent as they are here shown to be. The real fact is, that, however good the police and medical arrangements may be in compelling resident prostitutes to register themselves and in detecting cases of disease among such women, they are yet powerless to prevent illicit intercourse with women in the fields and along the roads in the vicinity of cantonments. It would be impracticable to try and prevent this by establishing a cordon of police; but several officers have mentioned to me their belief that the establishment of regimental Lal Bazaars would tend to diminish this practice. It has also been suggested that men suffering from venereal affections should be placed, during their stay in hospital, under stoppages. I think that all men who during

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two years have suffered from this form of disease might well be subjected to a weekly examination for a certain period; but, in my opinion, the real measures to adopt lie in quite another direction. I am certain that the enforced idleness of the life the British soldier leads in India tends very materially to the prevalence of both drunkenness and incontinence, and that the only effectual remedy for diminishing the large annual loss of service to the State from each of these vices is to afford the men such healthy employment as will occupy their minds and so lessen the temptation to commit them. Why should not the British soldier in India be employed in building barracks, in draining his lines, in making roads, or in cooking his food? By such means he would learn to rely on his own resources as the continental soldiers do, and his health would, I feel certain, improve; but to enable him to do this he should be on the hills and not in the plains.

Drunkenness.

In the whole army 972 men, or 9·56 per cent., were during 1876 total abstainers. There were 4,065 (or 39·90 per cent. of strength) cases of drunkenness reported during the year. I think the above statement should lead the authorities to forbid the issue of spirits at the canteen, and to try and introduce a less heavy liquor than porter. All the medical officers I have consulted are unanimous in condemning the issue of spirits. If it is continued, it ought to be largely diluted with pure water. It is argued that, if this comparatively wholesome spirit is not issued at the canteen, the men will get hold of the much more fiery country liquor, and doubtless there is much truth in the assertion; but I believe the difficulty might be overcome, first, by forbidding any sudder distillery being established within 20 miles of a large military cantonment, and then by compelling all liquor sold by retail dealers to be diluted to a certain strength.

Effect of hill climates on health of troops.

I venture to hope, not only that the question of placing the European troops serving in this Presidency on the hills will engage the attention of the authorities, but that really some practical measures will be undertaken to give effect to a proposition which every one allows is the proper course to adopt. The extension of the B. B. and C. I. Railway through Rajpootana will bring the foot of Mount Aboo within reach of troops both from Nusseerabad and Ahmedabad. The capabilities of Aboo are well known to His Excellency the Commander-in-Chief, and a special report on it was submitted by a committee of which Mr. Lumsdaine was a member. I regret to see money spent in building new barracks in the plains, as has lately been done at Ahmedabad. The stations of Baroda, Ahmedabad, and Deesa are exceptionally trying to the European constitution; but if the European troops were kept on the top of Mount Aboo they would be far better able to stand the effects of the hot arid plains if their services were ever required in them than if they are kept gradually, but surely, deteriorating at these stations. Then, again, Neemuch and Nusseerabad ought, in my opinion, to be abandoned as stations for European troops; but it is, I am told, absolutely necessary to have them in this part of Rajpootana. But why not put them on the hills? The Chittore range of hills are central, and the climate there is invigorating compared to the plains. The erection of new barracks at Ghorpuri I regard as a great mistake, as no measures that can be taken will ever make the site of these lines a healthy one, and I think that the new barracks that have been sanctioned are of a wrong design.

Native Troops.

Sickness and mortality in Bombay Native Army.

The following table compares the sickness and mortality of the Native army with the statistics of the previous year and the average of the five previous years:—

	Ratio per 1,000.		
	Admissions.	Daily Sick.	Deaths.
1871–5 (mean) -	1,289·2	39·4	9·1
1875 - -	1,146·3	33·9	9·3
1876 - - -	1,191·9	37·9	13·1

The year 1876, though below the mean as regards its admission and sickness rates, compares unfavourably as regards these two rates with 1875, and very unfavourably with any of the preceding five years as regards its death-rate.

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The principal causes of admissions will be learnt from the following statement:—

Causes of Admissions.	Number of Admissions.
Fevers (malarial)	12,167
Wounds and accidents	2,885
Rheumatism	1,619
Respiratory diseases	1,419
Diarrhœa	768
Eye diseases	767
Dysentery	726
Abscess and ulcer	651
Venereal diseases	453
Scurvy	193
Cholera	112
Spleen disease	95
Hepatitis	57
Small-pox	54
Total	21,966
Total from all causes	26,918

Tracing the number of admissions by seasons, we find that the cold and rainy months are most unfavourable to the Native soldiery.

The total number of deaths in and out of hospital during the year amounted to 296, or 83 more than in 1875, and 85 more than the average of the preceding five years. The death-rate, therefore, equals 13·11 per 1,000 of strength, and is the highest in the series.

The principal causes were the following:—

Causes of Deaths.	Number of Deaths.
Cholera	53
Respiratory diseases	46
Fevers (malarial)	45
Diarrhœa	10
Phthisis pulmonalis	9
Dysentery	8
Apoplexy	5
Wounds and accidents	3
Spleen disease	2
Atrophy and anæmia	—
Total	181
Total from all causes	296

Fevers. The aggregate number of admissions from fever in 1876, though greater by 760 than in the preceding year, is less than the average number during the last five years by 1,485. 11,986 were cases of ague, and 181 were of the remittent and continued types. The greatest number of admissions from ague took place in September, October, November, and December, the maximum being reached in November. Remittent fever was most prevalent in December.

Respiratory diseases. The admissions for respiratory diseases were equal to 62·8 per 1,000 of strength. The number, though less by 72 than in the preceding year, is greater than the average for the last five years by 167. This class of disease is always one of the chief causes of mortality among the Native troops, and, when cholera is not prevalent, invariably heads the list.

Cholera. The admissions from cholera during the year amounted to 112, or 5 per 1,000 of strength; 53 of these cases proved fatal. In 1875 there were 120 admissions and 71 deaths from this cause.

Small-pox. 54 cases of small-pox, equal to 2·4 per 1,000 of strength, were admitted during 1876. As usual it appeared in the cold weather. Exactly half of the cases took place among the regiments quartered at Poona. A man of the 7th N. I. at Tanna died from this disease in January, but this was the only fatal case in the whole of the Native army.

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Jails.

Sickness and mortality in jails.

The following were the health statistics of the 25 jails under the jurisdiction of the Inspector-General of Prisons in the Bombay Presidency :—

	Ratio per 1,000.		
	Admissions into Hospital.	Daily Sick.	Deaths.
1871–5 (mean) -	912	29	26·8
1875 - -	895	32	28·2
1876 - - -	782	28	20·6

The admission-rate was 130 per 1,000 less than the quinquennial average, and 113 less than in the preceding year; whilst the daily sick-rate is 1 less than the mean, and 4 less than in 1874 or 1875. The death-rate, 20·6 per 1,000, is 6·2 per 1,000 below the mean, and 7·6 per 1,000 below that of 1875. These results may be considered so far satisfactory that they prove that the jail population in the Bombay Presidency was healthier during 1876 than in any of the previous five years except 1873, but the rate is yet, in my opinion, much higher than it ought to be.

The lowest admission-rate per 1,000 of strength was 339·8 in the Belgaum jail, and the highest 1,124·3 at Kurrachee.

In Satara jail, with an average strength of 221 prisoners, no deaths took place during the year; but the death-rate in Hyderabad attained the very high rate of 56·14 per 1,000. The following table gives some of the jails arranged according to their death-rates :—

Hyderabad - - - - - -	56·14
Karwar - - - - - -	41·96
Surat - - - - - -	39·22
Ahmednuggur - - - - -	34·28
Kaira - - - - - -	30·53
Bombay Common Jail - - - -	30·30
Rutnagherry - - - - -	27·03
Rajkot - - - - - -	26·66
Kurrachee - - - - - -	25·97
Ahmedabad - - - - -	24·56
Dohad - - - - - -	21·74
Yerrowda - - - - -	19·70

Although the latter prison showed a comparatively low death-rate, its sanitary condition, tested by the daily sick-rate, was very unsatisfactory.

In the next table the prisons which suffered most severely from fevers and bowel complaints are ranked in order :—

Fevers.		Bowel Complaints.
Intermittent.	Remittent and Continued.	
1. Kurrachee - - -	1. Ahmedabad - -	1. Dharwar.
2. Yerrowda - - -	2. Bombay Common Jail - -	2. Dohad.
3. Surat - - -	3. Nara Gang - - -	3. Rutnagherry.
4. Nara Gang - -	4. Hyderabad - -	4. Kurrachee.
5. Dhuliakot - - -	5. Kurrachee - - -	5. Bombay House of Correction.
6. Dhulia - - -	6. Kaira - - -	6. Hyderabad.
7. Shikarpur - - -	7. Yerrowda - - -	7. Dhulia.
	8. Karwar - - -	8. Ahmedabad.
	9. Bombay House of Correction -	

Dysentery and diarrhœa are always very fatal among the jail population of this Presidency, and generally about a quarter of the total deaths are caused by these diseases; I think it would be desirable that this fact should lead to a systematic investigation of the food supply and drinking water.

Eighteen cases of cholera occurred in five jails in 1876, of which 8 proved fatal.

The diseases connected with the organs of respiration have, during the last two years, undergone a most satisfactory diminution.

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The amount of superficial area allowed to each prisoner is only 36 square feet, and the cubic space authorised to date is 648 cubic feet. The question has constantly forced itself upon me when inspecting these jails,—Can an adult man, with such a limited amount of superficial area, be kept in health? My own opinion is that the space allowed is much too small. I do not think the amount of superficial area for a healthy man ought to be under, at least, 60 square feet. If such an amount of superficial area is fixed upon, then there ought to be the very freest means of ventilation provided, but this is not the case in most of the jails. Jail accommodation.

The jail at Satara has been condemned, and rightly so, in a sanitary point of view; but no funds are forthcoming to build a new one. The disposal of night-soil at this jail requires attention, as it is now buried in the vicinity of the jail on the side of the hill on which it stands, but at a higher level. I think it ought to be carted away. The jail at Belgaum also has been condemned.

The Dharwar jail was very clean, and great attention is paid to its sanitary condition; but I do not think there is sufficient accommodation or ventilation in it.

The Sholapur jail was overcrowded. The main sanitary defect in it is a want of ventilation in the barracks. The mode of burying the night-soil in the jail garden, in the vicinity of the well from which the drinking water-supply is drawn, is objectionable.

In the Ahmednuggur jail more ventilation is required, and it was overcrowded. To each of the solitary cells is attached a privy, which communicates with the city drains, from which a very bad smell emanated. One of the wards of the hospital requires ventilation. The surface drainage generally needs improvement.

The Poona City jail was also found to be overcrowded: it is, in my opinion, not sufficiently ventilated, and the surface drainage is imperfect.

General Population.

The history of the famine cannot be written in this report; but it may be stated that, even in the worst districts during 1876, the price of the staple food, although seriously below the average, did not fall as low as in previous famines; as, for example, in 1804, when gram and other grains in the Deccan sold for 2 seers per rupee. Effect of the famine on health.

Imperfect registration of births and deaths among the civil population throughout the Presidency makes the compilation of the annual statistical tables regarding them a most unsatisfactory duty, as the results shown are untrustworthy. It is hoped, when the Sanitary Department gets thoroughly into working order, that, with the co-operation of the civil authorities, a marked improvement will take place in the registration. Success must depend principally on the amount of interest the officer in charge of the taluka and the collector of the zillah take in this subject. Vital statistics.

The difficulties in the way of ensuring a correct registration in India are, however, very great; and it will be a very long time before we can hope for assistance from the natives themselves, as the want of even elementary education among the people is one of our chief stumbling blocks. Another element of uncertainty, and one which would vitiate the mortuary statistics even if the number of deaths were correctly given, is to be found in the returns of population recorded in each district. No reliance, in my opinion, can be placed on them. It must be remembered that there was a widespread and deeply-rooted belief that the census was to be the precursor of additional taxation, and the people did not, I believe, give accurate information to the enumerators.

The figures shown in my report regarding the population are taken from the last census *plus* an assumed average increment of one per cent. per annum.

345,484 births were registered in 1876, or 4,655 more than were recorded to have taken place in 1875. On the assumed population of the year the birth-rate equalled 20·46 per 1,000; but if a comparison is to be made between the rates of 1876 and those published in former reports, an allowance must be made for the assumed annual increase since the census in the population of the Presidency, which is shown in this report for the first time. On the assumed population of 1875 the birth-rate equalled 20·01 per 1,000.

The total number of deaths recorded during 1876 among the general population in the Presidency of Bombay was 368,260, or 7,458 less than during the previous year. The assumed population in 1876 being 16,887,728, the death-rate, according to those figures, was 21·81 per 1,000. In 1875 the registered deaths amounted to 375,718, and the assumed population being 16,720,523, the death-rate was 22·11.

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The following were the highest recorded death-rates:—

Districts.	Death-rates.
Belgaum	31·75
Dharwar	30·86
Bombay City	30·66
Kanara	30·65
Ahmedabad	25·89
Ahmednuggur	25·62
Surat	25·12

In Bombay City, where the returns may be considered as approximately correct, the infant mortality formed 30 per cent. of the total deaths; whilst that of children from 1 to 12 was 22·82 per cent., and of old people 12·93 per cent., of the total mortality.

Cholera. A total of 32,117 persons are recorded to have died from cholera in 1876 among the civil population of this Presidency. This number, large as it is, is still 15,438 less than in the preceding year, when 47,555 deaths were registered.

The cholera during the year under report must, however, be considered as forming a portion of a great epidemic which, commencing at Nassick in March 1875, continued to the end of that year, when it somewhat subsided on the setting in of the cold weather, only, however, to be revivified in the hot and rainy months of 1876; and although hopes were once more entertained that it was dying out on the approach of the cold season, at the close of 1876 it was again becoming rapidly more fatal.

The highest number of deaths was recorded in the month of May, and the lowest in November, as will be seen by the following table:—

January	899
February	1,453
March	3,519
April	3,773
May	5,312
June	4,168
July	4,423
August	3,371
September	1,421
October	858
November	833
December	2,087
Total	32,117

The lesson I have learnt from all other outbreaks that I have seen in my Indian experience is that, leaving theories to be discussed by those who have not more earnest work to do, it is perfectly clear that cholera is a filth poison, and that where filth exists in food, water, air, or soil, there the ravages of this disease will be worst, *supposing* the factors necessary for its movement are also present. What all these factors are no man knows, but it is sufficient for practical purposes to know that filth is one of the prime movers of cholera, and that the surest preventive against outbreaks of the disease is that at all times and at all seasons the inhabited area should be kept free from filth, whether consisting of garbage, sullage, or excrement, and that the provision of a pure water-supply and of wholesome food, and the means of effectively and rapidly removing all effete matters, are necessary, if the ravages of the disease are to be stopped. Nothing short of these measures will be effectual, and it is a most dangerous delusion to wait until cholera is in movement before taking sanitary measures. There ought to be no change required in the execution of sanitary work; no extra precautions to be taken when cholera comes. All such action as may be considered necessary when the inhabited area is invaded by cholera is equally necessary at all seasons. One thing I can say from a somewhat large experience, cholera poison cannot become intensified in plenty of air and light.

Small-pox. 11,817 persons died from small-pox in the Bombay Presidency. This number is 8,356 more than in the preceding year, when only 3,461 deaths were recorded. The disease increased steadily from the commencement of the year until the month of March, when 1,822 deaths were recorded. It then gradually fell, until it reached its minimum in September, when only 329 deaths occurred; but it again acquired activity, and in December the very large number of 2,437 deaths took place.

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Small-pox is a poison which thrives best in the cold weather, and loses its intensity in hot weather. It is generally also absent during the rains, again to become active on the commencement of the cold weather.

Fevers.

In 1876, 220,833 persons are said to have died from fever in the Bombay Presidency. The number of deaths recorded is the highest yet registered under this heading, and it exceeds that of the previous year by 1,677. 19,338 deaths took place in January, but after that month a steady decline occurred, until the minimum (15,043) was reached in June. In July and August the number of deaths rose; and although a slight fall took place in September and October, a further rise in each of the two last months occurred, and in December the maximum for the year was recorded, 21,620. The highest death-rate from this cause was in the town of Umarkot, where it attained the very high figure of 29·55 per 1,000; and the city of Ahmedabad maintains its unenviable notoriety for its extremely high rate of mortality from fever.

Bowel complaints.

The deaths from bowel diseases numbered 33,683, about the same as in the previous year.

Venereal disease.

I must refer in this report to the terrible amount of hereditary syphilis which is to be found amongst the children of almost every class of the community, and to the virulent type of the infecting sore at present prevailing in every part of the country. The horrible notion that the people commonly entertain that a man suffering from syphilis can be cured by cohabitation with a clean woman very largely spreads the disease, which is, in my opinion, very seriously telling upon the general condition of the people, especially upon the rising generation, which is rapidly deteriorating from the effects of this poison. I fear that any preventive measures to check the spread of the disease are, for the present, impracticable; but I look upon the extension of dispensaries as the only sure means. The Grant Medical College is year by year sending out highly educated young men who are beginning to establish themselves in towns in the mofussil, and it is to their exertions that I think we must look for aid in this matter.

Vaccination.

The Vaccination Department, over which Dr. Pinkerton had for nearly nine years presided with eminent success, was brought under the direct control of the Sanitary Commissioner on the amalgamation of the two departments in November 1876. No change has taken place in the Bombay system of vaccination as organised and year by year perfected by the late able and zealous Superintendent-General.

The following statement shows the number of persons vaccinated and re-vaccinated in 1876–77 among the civil population and in the army :—

		Primary Vaccinations.	Re-vaccinations.
Civil	Itinerant	705,182	77,111
	Dispensary	19,996	2,999
		725,178	80,110
		805,828	
Army		9,889	
		7,006	2,883
		815,177	

The total number of persons primarily vaccinated in 1876–77 was 732,184, being an increase among the civil population of 40,176, and in the army of 1,369, or a total of 41,545 over the year 1875–76.

Of the above number, 95·35 per cent. were successfully operated on. This is a lower standard of success than what has hitherto been annually shown; but I would remark that this falling off is only an apparent one, for of late years the standard forms have shown the percentage of success attending *operations*, not *persons*.

A comparison with former years shows a steady advance in the number of persons primarily vaccinated :—

1869–70	464,667
1870–71	496,582
1871–72	527,153

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1872–73	570,025
1873–74	625,818
1874–75	671,817
1875–76	690,639
1876–77	732,184

Inoculation was practised in the Rutnagherry and Surat Collectorates, and in some parts of Sind. The Commissioner in Sind issued notices explaining the evil effects of inoculation, and requesting the Collectors, their deputies, and the Municipal Commissioners, and all mukhtyarkars, zemindars, patels, and tapadars to assist the vaccinators in carrying on their duties in an efficient manner, and to set an example to ignorant people by advice and by using their official and personal influence.

The police patel of Tanger, in Rutnagherry, was fined one month's pay for neglecting to report the action of the inoculators in his village. A few more such examples will be sufficient to deter other police patels from affording assistance to or conniving at the movements of the inoculators, should they be inclined to do so.

Sanitary Works.

Military works.

Of the stations under the Bombay command in which European troops are quartered, I have, during the year, inspected the following:—Bombay, Poona, Kirkee, Ahmednuggur, Purandhar, Belgaum, and Satara.

I may here mention some of the glaring sanitary defects which attracted my attention in every cantonment visited.

In the introduction to the "Suggestions for the Sanitary Improvement of Indian Stations" it is truly and forcibly stated that "the universal prevalence of malarial disease in Indian stations "indicates a malaria-generating condition of the earth, and one of the first improvements "required is to diminish or remove this condition." These words apply now in 1877 with as much, or even with greater force than they did when they were written thirteen years ago. The inspections I have made have most strongly impressed on my mind the absolute necessity that exists in this country, 1st, for lowering the water-level and for aerating the ground around habitations by *deep subsoil drainage*; 2nd, for providing surface drainage for the rapid removal of the storm-water; and 3rd, for the introduction of pipe-sewers through which the excreta and sullage could be at once carried away from the vicinity of dwellings where they do harm to the land where they would do good. At present the monsoon rain drips from the eaves of nearly all military buildings, barracks, hospitals, patcherries, &c., in the Presidency, and soaks into the already saturated ground, and in too many cases the water-level under the ground on which they stand rises to within a very short distance of the surface. I may instance Satara as, perhaps, an extreme case, where, under a barrack in which during the rains of 1875, I was informed, the men had suffered very much from fever, I found at my inspection in July 1876 a spring which flowed out in a strong stream. Or I may mention the houses in the officers' lines at Ghorpuri, which are situated on the absorbent black cotton soil forming the banks of one of the principal surface water-channels of the Poona cantonment, and which have hitherto been fever-nests, though I hope the surface trenches which have been so wisely dug during the year under report will do something towards preventing these from being as unhealthy as formerly; although, in my opinion, their inmates will be constantly exposed to repeated attacks of fever *until* the water-level has been lowered, and the ground in their vicinity has been aerated by scientifically laid *deep subsoil* drains, which will make the retention of water in it an impossibility.

In the meantime each succeeding year's statistics prove that the European and Native armies in this Presidency suffer from malarial fevers to an extent which fully bears out the description of the soil as quoted above, and it requires no prophet to foresee that they must continue to do so until the action so long ago recommended by the Commission, and so long delayed, is taken. I may, however, respectfully say that, in my opinion, no radical improvement in these matters will be made until the Government takes the matter into its earnest consideration, and orders the funds to be provided for the execution of those structural works in stations which experience has proved to be absolutely necessary.

Again, with reference to the construction of buildings, it is stated in the "Suggestions:" "the first improvement suggested by the evidence taken before the Royal Commission on "the Sanitary State of the Army in India is that all future barracks and hospitals should "be on raised basements with the air circulating under them;" yet in face of this there is not, as far as I know, one single barrack or hospital in this Presidency in which this most absolutely essential precaution has been taken.

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Then, again, in India the necessity for providing, in addition to deep subsoil and surface drains, a proper system of scientifically constructed pipe sewers has not forced itself on engineers, and they are content with the rude and barbarous systems for the removal of excreta and sullage that were in existence when we first took India. I have strongly protested against the objectionable modes adopted for the removal of these matters, such, for example, as the vessel which is to be seen round most of the new and old barracks in this Presidency, consisting of a large iron receptacle, which is, generally speaking, covered, but in some cases stands on the surface of the ground, whilst in others it is sunk below it, and which is supposed to receive the ablution-room water in the case of those barracks in which these places are so objectionably allowed to be under the same roof as the barrack-room; but even in the new barracks the bathing and cook-room water from the sergeants' quarters flows into it, but not always, for, as at the infantry barracks at Ahmednuggur, I found this water had run into the masonry pit in which the iron receptacle was placed, so that this vessel was floating. In all these cases I have recommended that this water should be carried through a 3″ glazed stoneware pipe, or an open channel, to the company's garden; but the real remedy is to have in all regimental lines a system of pipe sewers, which should convey the night-soil, ablution-room water, cook-room liquid refuse, &c., to a sewage farm.

I must condemn, in the strongest manner I can, the existing practice, throughout this Presidency, of the disposal of the night-soil. It is at present in almost every station deposited in deep pits, which, when full, are left gradually to consolidate. This process, of course, means the saturation of the soil for many yards in the immediate vicinity of the pits. It is in every way dangerous, unscientific, and wrong; and the practice ought, in my opinion, to be stopped once and for ever by order. I have, over and over again, suggested that a field should be selected to leeward of the cantonment, and at a distance from any well or drinking water-supply, and that a long trench, 2 feet broad by 1 foot deep, should be excavated along its length. The night-soil should, every day, be poured into it for a depth of *not more than* 6 *inches*, and then be covered over with the earth excavated from the trench alongside. When the field has been completely manured in this way it should be allowed to stand for three months, and should then be ploughed up crosswise, when it would be fit for cultivation. In every case a suitable crop should be sown.

In some cantonments the condition of the native bazaar is a point of the greatest possible danger to the troops.

The actual outlay on military sanitary works during 1876 was Rs. 6,96,910. The following are some of the works executed.

Poona.—The surface drainage of the lines occupied by the European Infantry Regiment at Ghorpuri has been improved.

Kirkee.—Draining the ground between the horse lines and the grass-yard; also on both sides of the road leading to the graveyard.

Sholapur.—Two pucka bath-rooms on the authorised scale, connected with the hospital verandah by a covered passage, and supplied with a paved drain to lead off waste water, have been constructed. A well 20′ in diameter and 55′ deep, with masonry lining, has been constructed at the north-east corner of the Native Infantry lines, providing a supply of water which is most opportune in the present juncture.

Ahmedabad.—Rs. 2,28,230 spent on barracks for European troops. Three latrines, each with ten compartments, have been constructed. Water used to lodge in different parts of the camp; the hollows have been drained by cutting new channels connected with the existing water-courses, which have been deepened and improved to effect the object in view.

Assirgurh.—At a cost of Rs. 33,339, the Mamoo Bhanja Tank was pumped and cleaned out; the masonry division wall was dismantled and taken away, as also a masonry filter with its accompaniments; trees and other vegetable matters around and in the tank were also cleared away as far as was possible. At the time of cleaning out the tank there were 12 feet of water in it, and on an average 25 feet of mud.

Mehidpur.—All the drains within the cantonment have been cleared and widened; the cost was about Rs. 3,000.

Dharwar.—The new hospital, built according to the standard plan, with the necessary quarters, has been completed and occupied during the year. The superstructure in the hospital consists of stone and lime masonry, covered with a double-tiled roof with ventilators.

Colaba.—Barrack accommodation provided, at a cost of Rs. 2,49,977.

Aden.—Rs. 76,665 expended on barracks and Native Infantry lines.

Civil works.

The sanitary condition of the towns and villages in this Presidency is, and must be for many years to come, I fear, in an unsatisfactory state. In those where the Bombay District Municipal Act is in force there are more or less successful attempts made to carry out the

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sanitary provisions of the Act, but in the whole Presidency there are only 10 city and 170 town municipalities where the Act has been brought into operation. I am of opinion, as at present it is impossible to raise money for the execution of sanitary work in any other way, that it would be desirable to extend its provisions so as to include places further apart from each other than one mile, and containing a smaller population than 2,000, which is the number now required to live within a district before it can be constituted a municipality; or I would suggest that a third kind of municipality, namely, a village circle municipality, should be constituted, which might embrace a certain number of neighbouring villages, for the cleansing of which there might be a peripatetic establishment which could visit and clean in succession each village within its limit. I am glad to acknowledge that much good work has been done in the principal towns in many collectorates, and in such the benefit of the work has not been confined to the town itself, for the simple fact of seeing what has been successfully carried out educates the minds of the villagers who attend the market days in the large towns. Still much remains to be done to bring the people themselves to a knowledge of the aim and object of sanitary reform, to win their confidence, and to convince them that these efforts are for the immediate benefit of themselves and their children. Customs that have been in force from time immemorial have, however, so blunted the perceptive faculties of even the higher class of natives, who have, I am firmly convinced, a desire, if they only knew how, to be clean, that they have never recognised, and even now have a difficulty in believing the fact that they are living under conditions where their own health and that of all dear to them must deteriorate; for example, in Belgaum and Dharwar, where the municipal commissioners, whom I had the pleasure of meeting, did not see anything horrible in living and sleeping and cooking their food in an atmosphere tainted with their own excrement, or in drawing their drinking water-supply from wells which are sunk within a few feet of the pit privies attached to their houses; but if the higher classes have some sense of cleanliness and decency, the lower castes are in their manners and customs indescribably filthy.

At first sight it seems almost hopeless to try and teach such people; but nothing, in my opinion, would tend to create in them a desire to raise themselves out of their filth, or to help themselves in sanitary matters, more than the establishment in *every* village throughout the Presidency of a school where elementary education could be provided.

It will, in my opinion, be impossible to introduce sanitary reforms into the domestic arrangements of the great mass of the people until the women are better educated, but there are only 233 girls' schools in the Presidency.

The conservation of the water-supply in towns and villages is, of course, one of the chief points which the officers in the Sanitary Department must diligently urge upon all civil authorities, and it is a matter the importance of which is, I hope, beginning to be recognised by natives. Municipalities all over the country are turning their attention to the construction of waterworks and the bringing in of a plentiful supply of pure water from a distance.

One of the greatest necessities of Indian towns and villages is the drying and aeration of the subsoil by drainage, and the provision of channels for the removal of sullage clear away from every habitation. At present it is not an exaggeration to say that the subsoil around every domicile in India is saturated with decomposing organic matter, and in this fact lies, in my opinion, the explanation of the apparently mysterious and erratic characteristics of cholera. Be that as it may, there can be no doubt that this filth-sodden soil is the cause of the fevers which decimate the inhabitants of this country, and though this fact is patent to all, the difficulties in making practical suggestions for effective remedial measures are great.

The introduction of the Bombay halalcore system into towns until they can be sewered is much to be wished. The collection and removal of night-soil is essentially a matter which should be undertaken by municipalities. For villages where there is no money forthcoming for the pay of establishments, systematic endeavours should be made to teach the people to help themselves.

I have been favoured with interesting accounts of waterworks carried out at Pen and Alibag, also of similar works at Kolhapur and Jamkhandi.

The town of Pen, one of the four principal towns of the Colaba collectorate, is built on high ground overlooking the Bagawattee river. It is the mart for the produce of most of the villages of the collectorate lying east of the Amba tidal creek, and has a large floating population. The water-supply hitherto has been from wells and tanks, which are nearly dry during the hot season, when the want of water is much felt. The river is much below the level of the town, and at some distance from it, and works for storing water and lifting it would be extremely costly; but to the east of the town, and about three-quarters of a mile from it, is a valley through which a small stream runs, and which is sufficiently high to deliver water in the town under pressure.

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The town of Alibag is situated on the edge of a sandy sea-shore fringed with cocoa-nut trees; the general level is about 1½ feet above high-water mark, and between the sandy slip on which the town is built and the nearest high and harder soil is a tidal creek or swamp.

Under such circumstances it follows that, though water exists in abundance at a few feet below the service, it is all more or less brackish.

After investigation, it was decided that an old tank at Veshwie, one and a half miles from the town, could be extended from six to twenty-two and a half acres, and fed through a channel, three-quarters of a mile long, from a small river or mountain torrent running from the Sagarghar range. From the lake thus formed it was found that water could be delivered under low pressure throughout the town.

At Alibag resides the only son of the late Diwanji of Angria, a gentleman possessed of a moderate private fortune. Dhondiraj Vinayak Biwalkar, known as the Bhow Saheb, is of one of the best families of Chitpawan Brahmins; he is highly accomplished, and, though of a very retiring disposition, has ever interested himself quietly in matters of public importance. This gentleman displayed great interest in the survey while it was in progress, frequently visiting the collector and president of the municipality to inspect the plans, and hinting that he should certainly contribute to the full extent of his means. When he learnt that the cost of the head-works and the main up to municipal limits would be Rs. 20,000, he begged the collector for a few weeks not to bring the subject forward, as he would ascertain how much he could afford to contribute. In the meantime preparations were being made throughout India for the reception of His Royal Highness the Prince of Wales, and on the 29th October 1875 the collector was surprised by a visit from the Bhow Saheb, at which he offered to contribute Rs. 20,000, the whole cost of the scheme, as a humble token "of the deep feelings "of loyalty which inspire his whole family," and "a lasting memorial of the Royal visit." The Bhow Saheb added that he trusted that the works might be hereafter known as the "Royal Alibag Waterworks." The Municipality of Alibag, on the 5th November, thankfully accepted the gift.

At Kolhapur there are several sources of water-supply existing, but the water from the various tanks and wells in and near the town is not wholesome, and water has been brought in a duct from springs in the Katyanee valley, which is much prized by the inhabitants of Kolhapur, and considered particularly salubrious.

The old water-supply system from Katyanee, which is inadequate in quantity and impure in quality, owing to the porous nature of the pipes that convey it through the town, it is now proposed to remodel entirely, and to augment so as to furnish 10 gallons per head of the population per diem, and to re-distribute in iron pipes more diffusely and conveniently all over the town.

The design of the head-works of the proposed new supply scheme is an adaptation of the native principle of intersecting the water-bearing stratum with an underground channel or tunnel.

Jamkhandi, with a population of over 12,000, is the capital of a small Mahratta State in the south of the Presidency. It is about five miles from the River Krishna, and has hitherto drawn its water-supply from wells, most of which in bad seasons run dry, and much distress is felt on account of the lack of water. The town lies at the foot of a range of gneissic hills opposite the mouth of a gorge by which a nulla, some four miles long, and together with its tributary nullas draining about two square miles of rocky hill country, forces its way into the alluvial plain of the Krishna, about a mile from the town. The gorge or nulla valley narrows so as to present a splendid site for a dam, and here a dam of earth, rivetted towards the water with rough massive stones, had been built by a former chief, but the tank so formed had lately become very much silted up, so as not to give a greater depth than eight or nine feet of water, though the tank when full was of considerable area. For the present waterworks this tank, being at a considerably higher level than the town, was taken advantage of as a gathering reservoir. The dam was raised to double its original height with silt taken from the bed of the tank, and nearly one-half the old stone facing was rebuilt, as it was found to have no foundation. The contents are over 60,000,000 gallons, a quantity sufficient to maintain a supply of 10 gallons per head per day, even if rain did not fall for 12 months, as is sometimes the case at Jamkhandi.

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ABSTRACT OF REPORT OF THE CALCUTTA MUNICIPALITY FOR 1876.

(*Mr. C. T. Metcalfe.*)

Drainage.

In consideration partly of the Prince of Wales' visit to Calcutta, and partly of the state of the finances, the execution of the drainage works which had been sanctioned for the season of 1875–6 was deferred until the beginning of 1876, and operations had thus to be protracted until the rains had set in, which involved a considerable excess of expenditure under the head of road scraping. The total outlay during the year was Rs. 19,947, exclusive of cost of the land taken up.

The drainage operations have now arrived at a stage at which there is no dispute as to the necessity of completing them as quickly as possible. It is believed that by proper effort this may be easily effected within three years. The numerous outbreaks of disease, complaints of local unhealthiness, and petitions for drainage from the most appreciative portion of the inhabitants, and the very large increase in the house drainage connections, all point to the same end. Roughly speaking half the total mileage of sewers still remains to be constructed, and it may be presumed that this length will accommodate as many premises as that which has been already constructed. The large receiving sewers with their machinery, which have been constructed at so much cost, are waiting to perform their proper duty by the supply from their contributaries yet unmade. The presence of the main sewers renders it possible to drain the more remote localities where the greatest nuisances exist.

The total number of premises now in direct connection with the sewers amounts to 7,214; 2,503 were connected during the year. The difficulties, however, of householders connecting their privies with the sewers are getting more and more serious owing to the want of water for flushing them. This want cannot be supplied without the increase of the water-supply.

The brick sewers have required a few petty repairs only. Some pipe sewers had to be relaid, which was no doubt in consequence of the originally bad soil in which the sewers were constructed. These repairs confirm former observations as to the level of saturation of the soil having been very considerably reduced in consequence of the new drainage works. It is found that, where formerly sewers were constructed under almost insuperable difficulties owing to the abundance of subsoil water, now no difficulty whatever is experienced from this source when repairs or extensions have to be effected. This occurs in the case of pipe as well as brick sewers.

Water-supply.

The consumption of water is already over 6½ millions of gallons daily, and more than 14 gallons per head. There are 112½ miles supplied with filtered water, and 26 miles supplied with unfiltered water. Yearly the requirements of the town are increasing, and the problem during the past year has been how to supply 30 miles of unwatered streets with filtered water, and how to keep up the required supply of filtered water in the existing mains.

Taking a gallon to water a square yard, we have some 378,099 gallons of good filtered drinking water expended on roads at every watering. If there was a larger supply of unfiltered water, the filtered water now used for flushing latrines and watering roads might be saved, and a large saving be effected in the cost of watering streets by carts.

The cost of doubling the present supply of filtered water would cost about 24 lacs of rupees, and an extended unfiltered supply which is also urgently required from 5 to 13 lacs. The debt on account of the water-supply works already aggregates Rs. 57,56,000, and the Corporation has shrunk from imposing heavier burdens in the shape of taxation on the ratepayers by increasing the water-supply.

These questions are still in abeyance, and the sense of the present Corporation is that, if the charge for interest on the necessary capital to be borrowed can be found without increasing the burden of taxation, they will cordially support the extension.

During the year 705 houses or premises were connected with the water-supply.

The following is extracted from the report of the analyst to the Corporation on the quality of the water during 1876:—

"For the first three months of the past year the daily analyses of the Calcutta water were "carried on according to the method known as Wanklyn's process of analysis, which only "gives partial information as to the quality of a water. After the first quarter of the year "it was judged better to reduce the daily analyses to two examinations per week, and every

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" month to make a complete analysis of the hydrant water according to a very troublesome " and elaborate method introduced by Dr. Frankland. This method gives, however, a very " extended and fairly complete view of the composition and probable previous history of the " water examined, and for this reason alone the adoption of this method was desirable. In " addition to this, it has the advantage of being the system of analysis employed in all the " large towns in England, and by making analyses of the Calcutta water according to this " process we are in a position to compare our water-supply with that of other large towns.

* * * *

" Nine analyses of the Calcutta hydrant water have been made by Frankland's process; " the average result of the whole is here appended; and for the purpose of comparison, the " average composition of two of the London water-supplies is given also in the table :—

RESULTS of ANALYSIS expressed in parts per 100,000.

—	Total solid impurity.	Organic Carbon.	Organic Nitrogen.	Ammonia.	Nitrogen as Nitrates and Nitrites.	Total Combined Nitrogen.	Chlorine.	Hardness.		
								Temporary.	Permanent.	Total.
Average of last nine months of year - - - - -	15·79	·108	·036	·0001	·066	·102	1·053	1·85	2·79	4·64
London Water Supply, Southwark Co., average 1870 -	26·19	·160	·024	—	·260	·230	1·68	—	—	20·34
London Water Supply, New River Co., average 1870 -	26·43	·087	·015	—	·247	·262	1·52	—	—	20·82

* * * *

" The noxious impurities in water are almost wholly represented by the nitrogenous com- " pounds, and it is gratifying to see that in this respect the Calcutta water contains far " smaller quantities than either of the two London supplies above quoted.

" Some curious differences have appeared in the quality of the water at various seasons of " the year, but as our experience of the composition of the water, as shown by the process, " does not quite extend through one whole year, it would be premature to deduce any con- " clusion from these differences."

The Health Officer having given it as his opinion that several cholera outbreaks were distinctly attributable to the use of water from filthy tanks, the work of de-watering and filling up as many tanks as the resources of the Corporation admitted of was taken in hand.

Conservancy.

The expenditure for the year on conservancy amounted under all heads to Rs. 15,510. The public streets and lanes of the town have been regularly swept every day, and the sweepings and the refuse thrown from houses carted either to the railway platforms for removal to the Salt Water Lakes, or to tanks within the town which had to be filled up. The whole quantity aggregated 85,600 tons, or about 235 tons daily.

Large as is the mass of refuse disposed of, there still remain vast accumulations of it lying about, apparently unheeded, in every bustee, and even in very many dwelling houses, and it is nothing exceptional to find courtyards, recesses between walls and out-offices and outlying plots of waste land, or even entire rooms of lower floors, permanently converted into store rooms for refuse, the compulsory removal of which must sooner or later be effected by the Corporation.

The surface drains and channels were regularly swept and flushed, and the large conservancy drains kept as clean as possible by raking them out. A thorough removal of the accumulated solid filth from the latter is effected only once a year, with a view to securing a free flow of water during the rainy season. A more frequent stirring of their contents, although it would promote the flow of sewage to a certain extent, is fraught with so much discomfort to the public, and intensifies their noxious exhalations to such an extent, that it cannot be attempted except in cases of actual stoppage. The open ditches, being as a rule without a hard floor and having little or no fall, are scarcely more than elongated cesspools, and will continue to be the most objectionable of all conservancy arrangements until filled up and superseded by underground sewers.

Prosecutions have never been resorted to except in the case of offending parties persistently ignoring repeated warnings. Many cases of breach of the conservancy laws had to be overlooked, because the hands of the officers have been too full to attend to all of them. As a rule, prosecutions and fines have not resulted in more than spasmodic improvements in

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removal of nuisances. It is to be hoped and expected that the habits of the people, especially the town classes, will improve with the extension and completion of the sanitary works yet to be carried out.

Improvement of native villages.

Conservancy is not at present attempted in the interior of the bustees. It is a principle which appears to have been accepted without any opposition on the part of the Commissioners of the different wards that, where the cart cannot go, there there can be no conservancy. The result is that, while the main thoroughfares are daily swept and watered, the interior of the ranges of huts on either side is in a condition which it is almost impossible to describe. Although some improvements have been effected during the past few years, there still remains an amount of work to be done which will require a considerable expenditure of money, and some time must elapse before the condition of the town can be permanently improved. The residents inhabiting the European portion of the town have no conception of the condition of parts of the native quarter. The Health Officer describes that condition as follows :—

"It is impossible to conceive a more perfect combination of all the evils of crowded city "life with primitive filthiness and disorder than is presented in the native portion of "Calcutta. Dirt in the most intense and noxious forms that a dense population can "produce covers the ground, saturates the water, infects the air, and finds in the habits and "incidents of the people's lives every possible facility for re-entering their bodies, while "ventilation could not be more shunned in their houses than it is if the climate were arctic "instead of tropical."

The condition here described is generally applicable to the interior of the various blocks into which the city is divided. The city is intersected by several large thoroughfares which sub-divide the various wards into regular blocks of houses. While these main thoroughfares are clean, a few yards behind the first row of houses the ground is occupied in some blocks by undrained lanes and houses, and in others by the so-called bustees.

The problem before the Corporation is this. Given a large town covered with houses, erected without any semblance of order, teeming with a dense population, chiefly migratory, without latrines, and without any attempts at sweeping. All the refuse both of the house and the cook-room is thrown into open ditches filled with putrefying matter, and a black greasy slime, often several feet in depth. Generally in the centre of these blocks there is a tank into which the sewage runs; on all sides there are privies, which void their contents into the water. The official analyst's report shows that the water in many of these tanks is of the character of London sewage. Shoals of worms are visible to the naked eye, and animalculæ when the water is observed under a microscope. Every hour of the day the residents use this water for cooking purposes, for washing and cleaning their utensils, their persons, and their soiled clothes, in close proximity to the discharge of the sewage from the latrines.

Let it be remembered that the proprietors of many of these bustees are poor, many are Hindoo widows, who cannot sell or part with their property, that the native is peculiarly zealous of what he regards as the "rights of private property," and the question is how is the Corporation to deal with a vast area under these circumstances. Owing to defects in the late Municipal Acts and to other circumstances, the desired improvements could not be carried out. In the first place, the law did not give sufficient power to the Corporation or to Government for the enforcement of sanitary improvements. In the second place, as many of the bustees or villages were intersected by deep public ditches or drains, which received the drainage and sewage of the surrounding area, the improvement of the ditches, which was the proper work of the municipality, was an essential preliminary to the improvement of the villages. The Corporation accordingly resolved to push on the drainage works rapidly and vigorously; the first and second class sewers have been completed, and third class sewers, which include the piping of the ditches, are in progress. As soon as the main ditches are filled up, the Corporation will be in a better position to deal effectively with the bustees.

Under the new Municipal Act powers were given to the Corporation,

(1.) To remove huts which were considered objectionable in a sanitary point of view.

(2.) To construct roads, sewers, and drains through the bustees, and to fill up low-lying lands.

(3.) To carry out the work, and recover the cost from the owners, should the latter neglect to pay.

(4.) To pay the cost from municipal funds in cases where the owners are unable to pay.

Notwithstanding these plenary powers, but little has been done, owing partly to the Commissioners being a new body and not thoroughly understanding the subject, and partly to irresolution on the part of some of them, and disinclination to interfere with private property.

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The new Corporation held its first meeting on the 23rd of October, and it is perhaps excusable that within the year no decisive steps were taken, but it is a remarkable fact that all outlay on account of the survey of lands to be improved was cut out of the budget for the ensuing year. The Health Officer has constantly pressed upon the Corporation the vital importance of this subject.

The present year (1877) will show what steps may be taken by the Corporation in the exercise of its powers. If the majority of the Commissioners take up the question in earnest, there is no practical obstacle to a very great improvement being made throughout the city.

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ABSTRACT OF REPORT OF THE HEALTH OFFICER OF CALCUTTA FOR 1876.*

(Dr. A. J. Payne.)

Effect of drainage and water-supply on health.

It is with zymotic or preventable diseases that sanitation is mainly concerned, and the following table shows for nine years the quantity of each of the most important classes of these diseases, which together are seen to produce about two-thirds of the total number of deaths in Calcutta :—

Years.	Cholera.	Diarrhœa and Dysentery.	Fevers.	Small-pox.	Other Causes.	Total.	Per 1,000 of Population, Census 1876.
1868 - - -	4,186	2,414	3,681	43	3,412	13,736	32
1869 - - -	3,592	2,011	3,837	39	3,316	12,795	29·8
1870 - - -	1,563	1,702	3,601	151	3,445	10,462	24·4
1871 - - -	800	1,489	4,249	32	3,729	10,299	24
1872 - - -	1,142	1,808	5,103	18	3,852	11,923	27·8
1873 - - -	1,155	1,652	4,746	34	3,971	11,558	26·9
1874 - - -	1,329	1,896	4,644	126	4,646	12,641	29·4
1875 - - -	1,726	2,098	5,432	782	5,031	15,069	35
1876 - - -	1,851	1,864	4,361	71	4,817	12,964	30·2

The point in this table which first attracts attention is that a large reduction took place between 1870 and 1872, and that since that time there has been an increasing death-rate. There are among the leaders of native opinion some who, though they will not own themselves open enemies of sanitary improvement, point to increasing mortality as an evidence of the inefficacy of all that has been already done. It is advisable, therefore, in the interest of the masses for whose benefit sanitary works are undertaken, to show that it is not the water-works and drainage that have caused mortality to grow, but that, if they be related in any way to growing mortality, it is through the insufficiency of the one and the tardiness of the other, which leave the untouched part of the town in a worse condition than before.

The water-supply, by its insufficiency, places the crowds who resort to the tanks in a worse position than they were, with their numbers increased, by removal of the roadside channels which provided them with less poisonous, though filthy, river water.

For the drainage, an annual money allotment from the drainage fund admits only of very tardy progress, with the result of keeping the greater part of the town, in this respect also, in a worse condition than it was before the commencement. The deep ditches which intersect its area could formerly at least be scoured by heavy rain and be rid of much of the solid filth they contained, but this is not possible during the progress of underground works. The main sewers can carry off fluid matter, but not the foul sediment of the ditches or the miscellaneous refuse that the people deposit in them. Wherever, therefore, a ditch is suffered to open into a sewer, a grating is fixed to intercept the underlying deposit, and allow passage only to the liquid ; and this state of things must continue until the replacement of ditches by sewers is complete. The ditches have thus been more foul and pestiferous than before, and the work of cleaning them, which has required an increase in the proper conservancy staff, has, instead, been made over with other conservancy work to the supervision of officers of the Engineer's Department, otherwise fully occupied. Even, therefore, if it could be proved that sickness has grown with the advance of the new drainage, it would furnish only specific evidence of the great mischief of delaying its completion, and of meeting a call for more active conservancy by disorganising the establishment. It may as well be said at once that, with particular reference to cholera and other entero-zymotic disease, there seems to be no present possibility of tracing anywhere the effects of the improved sewerage.

It is to the completion of house connexions that the officer of public health in England looks for the prevention of those diseases which here make up the great mortality, and it is the equivalents for house connexion demanded by local circumstances which alone can bring

* This report, though lengthy, consists more of reasoning than facts. The present abstract is consequently only a small portion of the report. Some other extracts on cholera causation are given at p. 40 of this volume.—Ed.

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good drainage to bear on the home life and habits of the people, wherein filth and sickness take their rise. Obviously, then, the time has not yet come for an estimate of the effect on public health of the Calcutta drainage works.

The action of the new water-supply on the public health is a subject that admits of much fuller inquiry.

The hydrants were completed in August 1869, and on the last day of that month they were supplied with pure water. The process was repeated on a few occasions in September and October following, and from the 1st November a full and regular supply was maintained.

A glance at the table is sufficient to show that, in some manner or other, a new era of cholera production opened towards the end of 1869. The fall in that year was strongly marked, and sufficiently well sustained to indicate a particular cause for it, and unless it can be shown that there was a similar fall elsewhere in productive places, which should point to cosmical or other general influence at work, it must be inferred that the agency was local.

The water-supply, from the mode of its introduction, was calculated to act, if it acted at all, in a sudden and conspicuous manner.

From the 1st November 1869 to 5th April 1872 a continuous pressure of 10 feet was kept up at night, which increased to 50 feet by day, but under demand speedily outgrowing the means of supply it was found impossible to maintain this. From the latter date night pressure ceased. There has been also a diminished flow in the street pipes between 11 a.m. and 3 p.m. from reduction of pressure. The demand for pure water has rapidly outgrown expectation and provision, and the desire to spread its benefits more widely has led to their being curtailed in quarters where at first there was no restriction. Reckless waste also on the part of the people has brought further necessity for limiting pressure as the only means of arresting it.

That this limitation has worked very perniciously on the public health cannot, I fear, be doubted; for many people have been driven, for personal and other ablution, to the filthy stagnant pools of sewage called tanks. In places they have been drinking from them too, and the cowherd's practice of diluting milk with the water nearest at hand must have forced the involuntary swallowing of sewage on every district of the town. Water-carriers, paid as servants to bring water to the houses from the hydrants, confess that, where it saves them trouble to do so, they draw from the tanks as well, so that, unless it be denied that the swallowing of liquid sewage can produce cholera, it must be admitted that no house in the town is secure against the poison of the tanks, except those to which water is directly conveyed by pipes, and where no milk is bought.

I propose to say no more at present by way of description of the bustees than is necessary to convey an idea of the so-called tanks, which, as far as I can yet see, are the means by which the worst mischief of the bustees is done. Although the language in which the latter have been described by others has been characterised as over-coloured and sensational, I have yet read no description which has produced in my mind a sensation approaching that which results from a view of the places. Although the water of Goa Bagan is chemically interposed between urine and effluent sewage, there are many tanks in town applied to domestic use which contain fæcal infusions of greater strength.

There appears no reason to doubt that the climate of Calcutta is very favourable to European life; that even the noxious surroundings of the native town do not harm those who live with ordinary care in places where there is fair regard to the laws of hygiene, which ordinary care does not mean exemption from anything that is necessary to the most active business; and that, where death prevails unduly among Europeans, it is certainly caused by personal habits or incidents of life, as it is among natives who live in the midst of filth.

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ABSTRACT OF REPORT OF THE MADRAS MUNICIPALITY FOR 1876–7.

(*Mr. L. R. Burrows.*)

Drainage. The attention of the Commissioners having been drawn to the sanitary requirements of the Municipality, the Drainage Committee was requested to consider and report on the following points:—

(1.) The adequacy of the present sanitary staff.

(2.) The possibility of intercepting and defæcating the sewage which now falls into the Cooum.

(3.) The more effectual removal of sewage by carts, boats on Cochrane's Canal, or the tramway.

(4.) The more extended use of sewage farms.

(5.) The regular flushing of all drains.

The Committee met seven times, but had not agreed upon a report before the close of the year; the more pressing duties occasioned by the famine, which began to be severely felt about the end of November, prevented the members from continuing their sittings.

An experiment was made, under the direction of the Committee, to see how the removal of all fæcal matter, liquid as well as solid, could best be accomplished. It was concluded that any scheme for preventing urine from finding its way into the surface drains by altering the privies in houses occupied by Hindus and Mahomedans would succeed only to a very limited extent.

Pending the settlement of the point at issue between the Commissioners and the Government of which mention was made in last year's report, it was not possible for the Municipality to take any decided course in the matter of drainage works.

The imperfect construction of the drains, and the small amount of water available for flushing them, have during the past year more than any other rendered an efficient cleansing difficult.

To some extent it may be said the main drain is flushed by being made to back up for 12 hours at the south end, and then allowed to discharge, which it does at a good velocity. The north end of the main drain is allowed to discharge at low tide during the night, but since it has been decided that it is more deleterious to open the south end at night when people are asleep, it would be well if the north end were open during the day also instead of at night.

The backing up of these drains naturally causes them to deposit silt to a considerable extent, which is very little affected by the velocity of the after discharge.

The main drain was cleared of silt along its whole length at a cost of 230*l.*

As long as every sort of filth is allowed to run into open drains, they will never be in a sanitary condition. The Municipality requires the public to help them in this matter by seeing that the refuse and other solid matter is otherwise disposed of. At present, people put all kinds of matter into the drains, for which they were never intended, at serious cost to themselves, their neighbours, and the general public.

A sum of 445*l.* was expended on the construction of new drains; and 346*l.* on maintenance.

Water-supply. Owing to the failure of the Red Hills water-supply as a consequence of the long continued drought, the Commissioners with the sanction of Government authorised a charge at the rate of 2 annas per thousand gallons being made for water used for other than domestic purposes. This charge was subsequently increased to 8 annas per thousand gallons, after it became necessary to raise the water by pumping. Although the revenue derived from this source was insignificant, the imposition of the charge had a good effect in checking waste.

Although the quality of the water was very bad, it was generally preferred for domestic purposes to the brackish water obtainable from the wells.

Thirty-nine houses were connected with the mains on the application and at the expense of the owners.

Eleven stand-pipes and cisterns were erected in different parts of the town; the 21-inch main was carried over the General Hospital Bridge, and a 4-inch branch pipe was extended

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up the Egmore High Road a distance of 243 feet. The piping throughout Madras and all valves and hydrants were maintained in good order. No bursts or leaks occurred.

Under the personal supervision of several of the Commissioners, 367 public and 105 private wells were cleaned and repaired, and 22 new ones were sunk.

The Water-supply Committee having been requested by the Commissioners to place themselves in communication with such professional gentlemen in the service of Government as might be able and willing to assist them, and to report on the best means for improving the water-supply, the Committee applied to Government for the assistance of an engineer. The Government expressed willingness to assist the Committee, but wished for information on certain points, the preparation of which, involving a considerable amount of labour and research, was being attended to by the newly appointed municipal engineer.

Conservancy.

The working of the Sanitary and Engineering Departments continued throughout the year much the same as it was in 1875–76. The unhealthiness of the season, the scarcity gradually intensifying into famine, and the insufficiency and apprehended total failure of the water-supply from the Red Hills, contributed to render the year one of unusual anxiety. In December the number of houseless poor in the streets and outskirts of Black Town had become so great, owing to the influx of starving people from the mofussil, that it became necessary to make a large increase in the conservancy staff, for the purpose of keeping the streets and parcherries in and about the town in a tolerably clean state. The nuisance most complained of was caused by persons easing themselves by the sides of the public roads and streets. The efforts of the police to check the practice appeared to have no effect. Constant and regular cleaning up was the only possible mode of dealing with the emergency, and this was carried out in a fairly satisfactory manner.

314,927 cart-loads of dirt, filth, and rubbish were removed from the town, amounting to about 112,500 tons in weight. It was disposed of principally in reclaiming low pieces of ground by the railway.

Inquiries were set on foot with a view to ascertaining the best means of getting the night-soil and rubbish conveyed to a sufficient distance from the city, either by railway or canal. The information received went to show that the removal by rail would be too costly, but that the canals (more especially if the proposed Junction Canal were completed) afforded the best and cheapest means of removal.

In addition to the 123 permanent public latrines there were 37 temporary latrines, or 160 in all, under the care of the Conservancy Department. Four permanent and twenty-one temporary latrines were erected during the year. Five urinals were erected in the 2nd Division, with apparatus for keeping them constantly flushed with water from the pipes. They promised to be successful, but soon after completion water was only available for a short time in the morning and evening, and it became necessary to close them, as without a constant supply of water they became a nuisance.

Sewage farms.

A considerable stride in the development of the sewage farms was effected during the year. By the erection of three new "picottahs" and the improvement of the old ones at Kistnampett, the raising of the whole of the sewage which was brought down by the Kistnampett nullah was rendered possible, and the old standing nuisance near the bridge on the South Beach Road was got rid of. A new farm with three picottahs was started at Triplicane on a piece of waste land belonging to the trustees of the Triplicane Pagoda. The whole of the sewage of the large drain which formerly used to discharge itself on to the low ground near the South Beach Road, causing a most offensive and sickening smell, was stopped and raised by picottahs on to beds planted with Hurryali grass. Although no profit has been made, the result from a pecuniary point of view is on the whole encouraging. A great sanitary improvement has been effected at a small cost, the whole of which will in all probability be more than recouped in 1877–78.

Improvement of parcherries.

What to do with or for parcherries may be considered one of the problems in the sanitation of Madras. They are usually a crowded collection of huts placed in such a manner that they can neither be well drained nor ventilated; in fact in some cases the parcherry is so much below the level of the adjoining land that it cannot be drained. The people who inhabit them are of the lowest class, and to live in dirt seems to be their natural state of existence.

Every endeavour is being made to improve their condition by drainage, and to increase ventilation by removing some of the huts and opening new streets through them. To ventilate some of these properly would mean removing half the parcherry. They are the hot-beds of disease.

To remove them totally, and place them in other localities under regulation, would benefit Madras immensely. One parcherry was totally removed, and the inhabitants were paid for

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their huts, and sent to other parcherries properly lined in streets, and with latrine accommodation.

But this cannot in all cases be accomplished on account of the expense, and the people are so poor that the rent derivable from new buildings put up for them in other places would never give a fair return for the outlay.

Many of these parcherries are, however, placed on valuable building sites, and in this case it might pay to remove them, as the rent derived from the huts must be very inconsiderable. It is not only in Madras that they have been found a nuisance. In Calcutta great attention was paid to the subject, and the remedies proposed were similar to those recommended above, viz., "roads, ventilation, drainage, improved huts, a better system of conservancy, "coupled with the construction of suitable latrines." With regard to the question, "Who "is to pay for all this?" it would appear that the owner or farmer of the parcherry is the proper person. In case the owner cannot from any reason make the improvement himself, it would not be unfair to ask him to surrender the rents or mortgage the property to the Municipality until the cost of such improvements is paid.

During the last few weeks of the year a special staff has been organised for the purpose of keeping parcherries clean. They are in gangs of ten, and they thoroughly clean out a parcherry, dig a hole and bury the rubbish, and then go on to another parcherry.

Health of Madras.

The deaths in the town amounted to 25,000, against 14,415 in 1875–76. The famine, with its attendant diseases resulting from starvation, numbered its victims by thousands among the poorer classes of the population, in spite of the most strenuous efforts put forth by the Government to avert the serious consequences of so dire a calamity. Cholera and small-pox soon appeared in its trail, while fever, dysentery, and diarrhœa continued unabated. Of the 25,000 deaths, cholera and small-pox caused 8,171, and fevers, dysentery, and diarrhœa 7,499, making 15,670 from these diseases alone. Without a single exception, the deaths in 1876–77 under each special disease were in excess of the averages of the previous 15 years, cholera alone having exceeded by 3,919, and small-pox by 2,724.

There appears a clear line of demarcation between the first eight and the last four months of the year. A normal average was maintained during the former; but from December, the month in which the famine completely invested the city, the mortality rapidly rose, from 1,193 in November to 2,071 in December, 3,743 in January, 4,401 in February, and 5,024 in March; the monthly averages of the two periods of the year being 1,220 and 3,810 respectively.

Small-pox, which was on the decrease in November, increased slowly during the following two months, and with the most alarming rapidity in February and March. Cholera rose steadily until the end of August, when it began to decline so rapidly that hopes were entertained that it would disappear entirely. These hopes, however, were doomed to disappointment. In November it again commenced an upward course, which was continued with great rapidity up to the end of January, when there was a sudden fall, which continued until the close of the year.

In this year again, as in 1875–76, it has to be remarked that children under six years suffered most. 41·00 per cent. of the total deaths occurred amongst them—boys 21·25, and girls 19·75. In the preceding year the proportions were—boys 21·65, girls 19·83, and total 41·48. But looking at the ratio of deaths to the population of each sex, it appears that, with the exception of ages 12 to 30 and exceeding 60, the mortality among males predominated.

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ABSTRACT OF REPORT OF THE BOMBAY MUNICIPALITY FOR 1876.

(*Mr. J. H. Grant.*)

Drainage.

The present state of the drainage system in Bombay is very defective, but it would not be expedient to incur a heavy expenditure on the improvement of any large area by means of the underground drains now in existence until a complete drainage scheme on a scientific basis can be carried out.

The project sanctioned last year for the surface drainage of the Flats is now being carried out, and will, it is hoped, in a great measure, if not entirely, prevent the nuisance caused by the flooding of the Flats with the sewage of Bombay during the monsoon months.

The nuisance so long complained of at Carnac Bunder has abated very considerably in consequence of the alterations and improvements effected during the year in the nightsoil depôt, and of the more rapid discharge of the nightsoil into the sea.

Disposal of town sweepings.

The reclamation of a small portion of the Flats progressed rapidly during the year, and before long the whole of the land made over to the Municipality for this purpose by Government will have been reclaimed. Dr. Weir believes that the question of the reclamation of the whole of the Flats is finally settled, and that the completion of this important work is now only a question of time; but it appears to me that this conclusion is somewhat premature. It is well known, I believe, that a former executive engineer of the Municipality, Major Tulloch, was strongly opposed to the scheme, on the ground that it would be impossible to raise the Flats without at the same time raising the low parts of the town, which would involve enormous expenditure, and might cause great dissatisfaction. The present executive engineer, Mr. Walton, is also opposed to the scheme on the same grounds, and is doubtful whether it ever can be carried out. It is not possible to conjecture, from what has been done in this direction already, or from what is being done now, what the effect of reclaiming the whole of the Flats would be, nor has it yet been ascertained what area would be flooded if the Flats were raised, or whether it would be feasible to raise that area too. Until these questions have been decided after careful investigation by the engineers, the question of the reclamation of the whole of the Flats cannot be regarded as finally settled, for, as Mr. Braham says, "until provision is made for the prevention of the flooding of the "lower portions of the city proper, a portion of the Flats must be retained to act as a "reservoir until the flood waters can be passed off through the sluices into the sea."

Water-supply.

The number of connexions with the waterworks increased by 325, the increase in the previous year having been 230.

Mr. Braham (deputy executive engineer), in a report on the improvement of the water-supply, recommends the construction of a reservoir for the Vehar supply at Bhundarwada Hill, in order to rectify the principal existing defects in connexion with the supply. These, briefly stated, are:—

The very slight pressure in the main during 14 hours out of the 24, and the consequent inability of house owners to obtain water when they require it. Many of them obtain it only at night, and have no means of storing it.

The wear and tear of the 32″ main in consequence of the variation of pressure, the excessive pressure at night in the distributing mains causing leaks to occur in joints and fittings.

The fact of many of the distributing mains being empty for several hours together, causing sewage and coal gases to enter where there are open joints, and the inequality of the distribution, some persons getting as much water as they like at all times, whilst others get hardly any at all.

The deterioration in the quality of Vehar water, owing to the great increase of vegetable matter in the lake, although gradual, is becoming very serious, and sooner or later something will have to be done towards checking it. Mr. Braham suggests that the evil might be greatly mitigated, if not entirely removed, by the importation of carp and tench from Europe, and recommends a reference to Mr. Frank Buckland on the subject; but the more practicable method of meeting the difficulty would be that suggested in his scheme above mentioned, whereby the whole of the Vehar water would be thoroughly filtered through five feet of sand before entering the reservoir.

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Health of Bombay.

The year was not a healthy one. Small-pox appeared very early in the year in an epidemic form, and the death-rate rose in consequence. From that disease there were 3,174 deaths; if these were deducted, the mortality of the year would be equal to 27·33 per 1,000; but inclusive of them, the death-rate rose from 29·07 per 1,000 in 1875 to 32·25.

There were 378 deaths registered from cholera, against 874 in 1875, the majority of the victims in both years being from the poorest classes of Hindoos.

The percentages of mortality have been calculated on the census of 1872, but as the population is known to have increased considerably since then, in consequence chiefly of the extension of cotton spinning and weaving factories and other industries, we may conclude that the mortality in 1876 was less than what is stated in the Health Officer's report.

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ABSTRACT OF REPORT OF THE HEALTH OFFICER OF BOMBAY FOR 1876.

(*Surgeon T. S. Weir.*)

The appearance of small-pox in the beginning of the year and of cholera in the monsoon, and the scantiness and irregularity of the rainfall, demanded that an unusual amount of attention should be paid to the cleansing of all drains. Drainage

As many as 175 miles of covered drains were opened and cleaned, against 166·8 in 1875, and 162 in 1874.

It is painful to consider the labour, the time, and the money expended in cleansing the ill-proportioned and defective drains of this city. To how much better objects could that money, that time, and that labour be devoted if the city only possessed a complete drainage system!

No approach has been made towards initiating a general drainage scheme for the city. The surface drainage, so necessary and so loudly demanded, has not even yet been begun; but I trust that the year 1877 will be marked by the commencement of a project, partly embodying the features of a system of subsoil drainage.

The defective drainage of the island was painfully brought home to us by the great flood in July. In some streets the water was six feet deep, and the Flats appeared as a vast sheet of water blending in the bordering low-lying and submerged lands. The ordinary channels for the removal of the storm-water afforded but little room for the passage of the waters, and the rush of water through many streets approached to the dimensions of a torrent. Many substantial houses in the low-lying districts were afterwards uninhabitable, their walls became mildewed, and the air of the buildings chilly and dank. If such was the condition of the better class of houses, what must have been the position of the dwellers in huts and the poorer classes of dwellings, which are seldom raised much above the level of the ground on which they are built?

The drainage of this city is little calculated to remove the refuse matter of the population, or to afford easy channels for its escape.

In my last annual report I gave a description of the horrible results of removing nightsoil by hand. It is not again necessary for me to speak at any length of the disposal of the nightsoil, for I feel convinced that, when once a complete drainage system has been carried out, the nightsoil will only be removed in one way—by the sewers. Once the public realise that by a simple house connexion they can be freed for ever from the nuisance and the presence of the sweepers, theorists may protest in vain against the admission of nightsoil into sewers. In no city in Europe could the removal of the nightsoil by sewers be attended with so little risk to the public health as in Bombay. Nearly all the privies are detached from the houses, and nowhere can privies be found enclosed in buildings as they are in English houses. With privies having an air-space around them, and detached from the dwellings, the dangers apprehended from sewer emanations are imaginary.

The sewers were unusually offensive this season. Ventilated by holes which are guarded by no appliances to dissipate the rotten odours that unceasingly arise through them, they spread their noxious vapours on every side.

The nightsoil pipe has been re-laid. It is a 15-inch cast-iron pipe about 3,500 feet in length. It discharges into the sea as nearly as possible two feet above mean sea-level, and it has a gradient of 1 foot in 430. Since the pipe has been laid down there has been no obstruction in it.

Considerable alterations have been made to the nightsoil depôt. The walls have been re-built and raised, and a roof has been put on. Along the ridge of the roof a ventilator connected with the furnace-chimney has been constructed. Six three-inch stand-pipes to carry salt water have been put up in addition to the fresh-water pipes already in the depôt. Salt water is pumped up to wash the nightsoil carts and the tanks, and to dilute the nightsoil. Two tanks to hold salt water have been built, so that no fresh water will be used, and the fresh-water pipes, which stood so invitingly to suck in fæcal air, may be removed. While the nightsoil is being pumped out, salt water is forced in to dilute and liquefy it.

The alterations have effected an improvement not so much in the atmosphere of the neighbourhood as in the appearance of the depôt, and it is estimated that 67,200 gallons of drinking water will be saved every day.

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In 1874 the nightsoil pipe was getting constantly choked, and in the beginning of 1875 the obstruction became so great that the pipe ceased to be effective. But 150 tons of nightsoil had to be removed every day, and, to accomplish that, the tanks had to be kept open for many hours, and often the nightsoil was oozing into the harbour at all states of the tide and at all hours of the day. Nightsoil discharged at flood-tide was carried for a short distance up the harbour, and insoluble portions may have been seen approaching certain bunders. A very serious nuisance was caused by the dribbling of the nightsoil into the harbour, and the trading community bitterly resented it.

To abate the nuisance, Mr. Ravenscroft recommended the improvements I have described. The more rapid and regular discharge of the nightsoil was chiefly contemplated, and it was hoped that in the quicker removal of the offending matter the nuisance would have perished. These hopes have not been disappointed. The nightsoil can be pumped into the sea in from 20 to 40 minutes, it is forced further out, it is more fluid, and consequently it is sooner lost in the waters of the harbour. Unquestionably the nuisance from the discharge of the nightsoil into the harbour has been very much diminished by the improvements that have been effected.

With the improvements to the depôt, and the rapid discharge of the nightsoil, the nuisance at the Carnac Bunder will almost have ceased, and the general traffic will not be sensibly inconvenienced by it.

Conservancy. Since 1868 there has been a progressive increase in the quantity of nightsoil collected, and the amount has gone up steadily 10 and 11 tons every year since 1873. There has been no extension of municipal halalcore service to account for the great quantity of nightsoil collected in the last two years. In 1876 there were collected 69,699 tons, equal to 190·9 tons a day.

The total amount of garbage collected amounted to 114,707·2 tons, equal to 314·2 tons a day, against 118,407 tons in 1875, 114,891 in 1874, and 113,859 in 1873.

Disposal of town sweepings. About one-half the garbage is sent to the Coorla Reclamation, and the greater portion of the remainder is laid down on the Flats.

The reclamation, by sweepings, of the putrid salt-marsh known as the Flats is actively progressing. The sweepings are laid down about 8 feet deep, a few inches of earth put over them, and cultivation begins as soon as rain comes. Some portions of the ground that were reclaimed years ago are irrigated with sewage and cultivated all the year round.

Water-supply. The amount of organic matter in the Vehar water, as measured by the albuminoid ammonia, began to increase towards the end of the previous year. Large quantities of vegetable matter are washed into the Vehar lake from the surrounding hills, and, as there is no special outlet by which it can be removed, most of it must remain in the lake to decompose. A sample of water examined on the 14th of February yielded the enormous amount of ·20 parts per million of albuminoid ammonia. After this the proportion became lower, but was very variable. In the week ending the 30th of May it rose to ·19 parts per million, but the week after declined to ·17 parts per million.

The rains may be said to have begun during the week ending the 20th of June, and in the previous week the organic contamination was so great as to be represented by ·19 parts per million of albuminoid ammonia. The monsoon had not well broken before the water-supply began to improve, and the organic impurities to diminish.

In the period from the 4th to the 18th of July it unhappily increased, and in the week ending the 18th of July the albuminoid ammonia rose to ·20 parts per million.

The increased impurity of the Vehar water was accompanied by a sudden rise in the deaths from cholera of from 5 to 24. Strange to say, there was unusually little vegetable matter suspended in the water, and it yielded but a trace of free ammonia. As the monsoon advanced, the water improved very much in quality, and in September the albuminoid ammonia wavered between ·07 and ·08 parts per million.

The improvement, however, was only transitory, and, as the season advanced, the water began to get more impure.

On the whole, the impression on my mind is, that the Vehar water was purer in 1876 than in 1875. On the 9th of June the strainers over the outlet conduits from the Vehar lake were repaired, and the meshes made smaller. The improvement in the strainer may have had the effect of diminishing the vegetable matter suspended in the water delivered in the city.

Considering the great facilities that exist in Bombay for the entrance of sewage into the water pipes, it is difficult to believe that the water is never contaminated.

In 1875 and in 1876 the water-supply engaged an unusual amount of attention, and the public have taken an increasing interest in the quality as well as in the quantity of the

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Vehar water. It may therefore be presumed that the executive officers have paid much attention to, and taken the greatest precautions against, sewage pollution of the water-supply.

The laying of water pipes in drains, sewers, or passages for house sewage and sullage, was a sanitary crime and inexcusable, and those who are responsible for it would have much to answer for if called on to give an account of the sickness and disease of which they have been the unconscious and ignorant agents.

The many factories that have sprung up in this city, consuming large quantities of drinking water in their boilers, have caused a scarcity of drinking water to be felt. A considerable number of the population, who cannot afford to wait for the tardy supply of Vehar water doled out to them, are obliged to use well water. The waters of many of these wells are very impure, and what their effect on the public health may be it is difficult to say and impossible to estimate.

The insufficiency of the Vehar water-supply has become so great that it is notorious; and as a defective water-supply may have grave sanitary results, it is no longer possible to avoid referring to it. Very great inconvenience and even suffering is inflicted on many classes and on many portions of the community, and the injured and irritated feelings of many citizens may be read in the columns of the press. In the hot season, owing to the deficient supply, it is necessary, in order to secure a general distribution of the water, to cut off the supply to particular portions of the city at certain hours, and even now in the daytime there is not sufficient pressure to carry the water to many portions of the city.

The chief cause of the insufficiency of the water-supply is the want of pressure. It is not due to the want of water in the Vehar lake, for there is sufficient water to supply every portion of the city if it was properly and carefully distributed. At the point of distribution the water has a head of only 16 feet above the level of the city.

It is attempted, with some success, to give for short periods at night a free supply to those districts which receive no water in the daytime. The night supply is on the intermittent system, and it results in a reckless waste of water. The public cannot afford to sit up at night to wait and watch for their water; they naturally prefer to leave the taps open, to allow the water to flow and to overflow as it pleases; the waste is enormous, and it only ceases when the water ceases to flow. It is estimated that over a million gallons of Vehar water are lost through wastage every day.

The mains and service-pipes being left open, enormous facilities for the pollution of the water exist, and there can be no doubt that it does occur to an alarming and dangerous extent in many portions of the city.

Mr. Braham proposes to construct a service reservoir, capable of holding one day's supply, on Bundarwada Hill, directly to the east of the point of bifurcation of the mains at the J. J. Hospital; all the water from the reservoir will be filtered. The immediate effect of a service reservoir will be that the water will be delivered at a pressure of 60 *feet instead of* 16 *feet above the level of the city, the mains will be always charged, and the water will be given to the consumers wholesome*, instead of being, as it is now, most probably unwholesome.

At a meeting of the Corporation held in the beginning of this year Mr. Braham's proposals were discussed, and there appeared to be a general feeling that the scheme was calculated to be of the greatest benefit to the city, and to remove defects in the system of water-supply that have long been felt. There was only a difference of opinion as to whether the works should be begun at once, or should be left till after the Tulsi reservoir had been completed.

In 1868 the Army Sanitary Commission in an admirable minute pointed out the dangers surrounding and threatening the purity of the Vehar supply, and the measures which should be adopted to remove them. The memorandum is a masterly summary of the sanitary questions involved in the Vehar water-supply.

The year has been marked by a most important sanitary advance. The Municipal Corporation have recognised in a formal manner that dipping-wells are a dangerous source of water-supply. At a meeting of the Corporation held on the 15th of June sanction was given for the expenditure of Rs. 8,300 to defray the cost of filling in the Pydhonee dipping-well, and erecting in its stead on the same site a covered cistern. The carrying to its full length of the principle will have the most important sanitary results.

Sanitary prosecutions.

As in years when epidemic diseases prevail, there has been an increased number of notices and summonses issued. 6,417 notices, and altogether 5,014 summonses were served, against 4,924 notices and 3,342 summonses in 1875.

It was a source of gratification to me to be able to withdraw 3,072 summonses, the offences for which they had been issued having been discontinued.

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Improvement of dwellings.

Great attention has been given in the year that has passed to the improvement of huts, and the dwellings of the poor generally. Many huts have been demolished or removed, and in the most overcrowded villages the owners of the property have been compelled to rebuild their huts in regular lines, to raise them two feet above the level of the ground, to leave three feet between each hut, and 20 feet between every line of huts.

Health of Bombay.

There has been progress in the registration of births, and I hope that by the end of the year the registration of births will be on an equally satisfactory footing with the registration of deaths.

Exclusive of stillborn, 20,783 deaths were registered in 1876, against 18,734 in 1875, and a mean for the previous 5 years of 16,990. The mortality was equal to an annual death-rate of 32·25 per 1,000 of population. There were 108·7 male to every 100 female deaths. The excess of deaths in the male population has been gradually diminishing since 1872.

While of each 1,000 males 27·08 died, 40·69 females, or, in other words, 50 per cent. more females than males died. Under 1 year of age the mortality was greatest amongst males. From 1 to 4 years the excess of deaths is on the side of the females. Between 4 and 6 years of age more males died. From 6 to 40, as in previous years, the rate of female mortality is very much in excess of the death-rate amongst males. The great mortality amongst females between 12 and 30 I believe to be due to diseases and conditions associated with child-birth.

The great permanent cause of the high infant mortality in Bombay is fever; in 1876, 2,575 children under 5 years of age succumbed to this malady. There were 2,666 deaths of children from small-pox; of 6,231 infants under 1 year of age who died, 1,301 died from this cause.

The year 1876 will be memorable in the sanitary history of Bombay for the great and fatal outbreak of small-pox. Three years—an unusually long period—had elapsed since the last epidemic. In 1875 only 248 deaths were registered, the smallest number since 1862. In 1876 the mortality amounted to 3,174. On the disease beginning to assume alarming dimensions, the Municipal Commissioner sanctioned the purchase of extra heifers and the employment of additional vaccinators. But even before this vaccination had been pushed with unusual vigour, and great numbers of people had been flocking to the vaccination stations. Morning and evening a vaccinator with a heifer had been sent round the streets, so that vaccination was brought to the very doors of the people. This house-to-house visitation had the most happy effects; by it many were vaccinated who would never otherwise have been, and the public were re-assured, and their hopes excited and sustained.

The deaths gradually but rapidly increased from the first week of the year till the middle of March, when the mortality reached its highest point. From this time, contrary to previous experience, the epidemic began to decline, and it had well subsided before the hot season set in. The early abatement of the epidemic was singular, and cannot well be ascribed to any other cause than the prompt and vigorous measures taken to check the disease.

5,867 deaths were registered from fevers, 65 of which were referred to enteric fever, 117 to simple continued fever, 170 to ague, and 5,515 to remittent fever. Although the deaths from fevers exceeded the number in 1875 by 623, they were 263 less than the average of the previous five years.

There appears to be a general unanimity of opinion that malarial fevers are less virulent now than they were many years ago. The diminution in the intensity of febrile affections is ascribed to the reclamation of the foreshore, and of numerous portions of swampy ground in the island, and to the generally improved sanitary condition of the city.

During 1876, 543 cases of cholera came to my knowledge, and of these 378 terminated fatally. Of those attacked, 375 drank Vehar water, and 168 well water.

Venereal disease.

There is a general impression among practitioners in this city that venereal affections are more prevalent than they were some years ago. The great increase in the number of cases of primary syphilis is a matter for serious reflection.

When it is remembered that syphilis is a disease not sudden and swift, but insidious and slow in its action; that the poor people of this city, owing to their social relations, are extremely averse to making public diseases of this nature by seeking advice and relief at public hospitals; and that marriage is compulsory on a considerable portion of the population, —a faint but startling idea may be formed of the ravages which syphilis, once it has become prevalent, may commit, and of the dangers that menace the national health and vigour. But even now, notwithstanding the fear of publicity, a considerable proportion of the hospital patients in this city are infected with one form or other of syphilis, and, as the great majority of these patients are either married or have been married, the extent to which this loathsome disease may be propagated in the community is very alarming.

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At my suggestion, Dr. Hewlett drew the attention of Government to the necessity of adopting some measures for preventing the spread of this class of disease, and advocated the revival of the Contagious Diseases Act.

Public opinion was at one time much opposed to State measures for the prevention of contagious venereal diseases. A considerable section of the English public regarded venereal diseases as a punishment for the sins of profligacy; and those who believed that the diseases arising from impure connexion are of the nature of a divine chastening were not likely to look with much favour on attempts to check so beneficent a visitation. Some have objected to the demoralising effects and the cruelty of the periodical examinations; but surely a woman who is prepared to expose her charms to the lewd gaze of any stranger is not likely to have her feelings outraged, or her modesty hurt, by a medical inspection.

It appears to me only reasonable that all who choose to earn their livelihood by the calling should be subjected to the regulations considered to be necessary for the public safety, in the same manner as those who elect to carry on a dangerous trade have to submit to the rules framed for the protection of the general public. As the late Dr. Parkes pointedly expresses it, "it is no more interference with the liberty of the subject to prevent a woman from "propagating syphilis than it would be to prevent her propagating small-pox."

The Act came into force in Bombay on the 1st May 1870, and remained in operation until March 1872, when, in accordance with a resolution of the Bench of Justices, it ceased to be enforced. It is somewhat difficult to say what effect the Act had in Bombay. That it was of the greatest benefit to the naval and military classes there can be no doubt. The class of prostitutes to whom they go were all registered, in fact they constituted the great bulk of the registered women.

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APPENDIX.

No. 1.

MEMORANDUM of the ARMY SANITARY COMMISSION on the REPORT of the SANITARY COMMISSIONER with the GOVERNMENT of INDIA for 1876.

In the absence of Dr. Cuningham, Sanitary Commissioner with the Government of India, the duties of his office were fulfilled by Mr. Townsend, Sanitary Commissioner of the Central Provinces, by whom the present Report for 1876 has been prepared.

The usual arrangement under separate sections has been followed, giving the details of—

Meteorology.
European troops.
Native troops.
Jails in Bengal.
Vital statistics, chief diseases, and vaccination among the civil population.
Military and civil sanitary works of the Bengal Presidency.

And the Report is followed by an interesting Appendix on Cholera in relation to certain Physical Phenomena, drawn up by Drs. Lewis and D. Cunningham as a contribution to the Indian Cholera Inquiry. The volume is concluded by the valuable annual statistics prepared by Dr. Bryden for European and Native troops, and for the jail population of Bengal Presidency.

It is proposed in the remarks which follow to include a brief summary of the leading statistical facts bearing on the sanitary condition of the troops and civil population which form the bulk of Mr. Townsend's Report, together with such matters of practical interest as the facts suggest, and to conclude the present Memorandum with some account of results obtained by Drs. Lewis and Cunningham.

1. *European Army in India.*—The following abstract table gives the general sanitary statistics of the whole European Army for 1876 in comparison with the data for five previous years, 1871–75 :—

Period.	Average Strength.	Ratio per 1,000 of average strength.						
		Admissions to Hospital.	Daily Sick.	Deaths.			Invaliding.	Total Loss.
				Cholera.	All other Causes.	Total.		
1871 to 1875 - -	58,432	1,394	57	2·58	15·09	17·62	43	61
1876 - - - -	57,858	1,361	56	2·32	13·00	15·32	39	54

The elements of inefficiency vary considerably in different years of the series, but the general result is that 1876 showed continuous improvement, and is hopeful for future progress.

2. The next abstracts give the facts separately for the armies of each Presidency.

BENGAL.

Periods.	Average Strength.	Ratio per 1,000 of average strength.						
		Admissions to Hospital.	Daily Sick.	Deaths.			Invaliding.	Total Loss.
				Cholera.	All other Causes.	Total.		
1860 to 1869 - -	39,068	1,733	66	9·04	20·81	29·85	41	71
1870 to 1875 - -	36,481	1,446	58	2·79	15·56	18·35	41	59
1876 - - -	36,582	1,443	58	3·14	12·88	16·02	36	52

A simple inspection of this table is sufficient to show how great has been the saving of efficiency in the Bengal Army during the last 17 years.

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The facts for the Madras and Bombay European armies have been discussed by the Commission on other papers, and may be briefly stated here as follows :—

	Per 1,000.		
	1860 to 1869.	1870 to 1875.	1876.
Madras :			
Daily sick	61·	57·	55·
Total deaths	19·99	16·38	15·77
Invaliding	49·	49·	41·
Total loss	69·	66·	57·
Bombay :			
Daily sick	56·	53·	53·
Total deaths	21·54	17·65	12·30
Invaliding	38·	39·	47·
Total loss	54·	57·	59·

These data likewise show a continuous improvement in efficiency, except in the amount of invaliding in the Bombay Army, which, from some cause or other, has been increasing.

3. The next abstract shows the ratio of admissions per 1,000 from the chief diseases in each Presidency in 1876 :—

Bengal.		Madras.		Bombay.	
1. Malarial fevers	558	1. Malarial fevers	200	1. Malarial fevers	507
2. Venereal diseases	195	2. Venereal diseases	184	2. Venereal diseases	179
3. Wounds and accidents	98	3. Wounds and accidents	94	3. Wounds and accidents	98
4. Respiratory diseases	81	4. Abscess and ulcers	92	4. Abscess and ulcers	95
5. Abscess and ulcers	77	5. Dysentery	64	5. Respiratory diseases	53
6. Rheumatism	65	6. Hepatitis	63	6. Diarrhœa	47
7. Diarrhœa	49	7. Diarrhœa	61	7. Hepatitis	44
8. Hepatitis	46	8. Respiratory diseases	60	8. Rheumatism	43
9. Dysentery	27	9. Rheumatism	43	9. Dysentery	28
10. Dengue	18	10. Eye diseases	14	10. Eye diseases	21
Total of 10 causes	1,214		875		1,115
Total of all causes	1,443		1,131		1,317

In each of the Presidencies, and as in former years, the chief admission cause is malarial fever. Next in order are venereal diseases, and then follow wounds and accidents. Hepatitis and dysentery show the following usual differences of prevalence in the three Presidencies :—

	Admissions per 1,000.
Madras	127
Bombay	72
Bengal	73

These differences have reproduced themselves year after year, and although attention has frequently been called to the subject, no removable causes have as yet been assigned for the much greater prevalence of hepatic and dysenteric affections in Madras Presidency than in the others.

4. The next abstract gives the deaths per 1,000 from the chief causes :—

Bengal.		Madras.		Bombay.	
1. Cholera	3·14	1. Hepatitis	2·00	1. Hepatitis	2·24
2. Apoplexy	1·77	2. Enteric fever	1·99	2. Enteric fever	1·86
3. Enteric fever	1·75	3. Apoplexy	1·90	3. Injuries	1·75
4. Hepatitis	1·42	4. Dysentery	1·72	4. Dysentery	·98
5. Phthisis pulm.	1·12	5. Cholera	1·54	5. Heart diseases	·98
6. Dysentery	1·04	6. Injuries	1·45	6. Phthisis pulm.	·98
7. Heart diseases	1·01	7. Heart diseases	1·27	7. Apoplexy	·78
8. Injuries	·80	8. Phthisis pulm.	1·00	8. Respiratory diseases	·78
9. Respiratory diseases	·79	9. Malarial fever	·46	9. Suicides	·59
10. Malarial fevers	·71	10. Suicides	·36	10. Malarial fevers	·29
Total of 10 causes	13·55		13·69		11·23
Total of all causes	16·02		15·77		12·30

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The following table showing the actual admissions and deaths from the more important diseases for the whole army (British troops) in India will give perhaps a more complete idea of the facts for 1876 :—

Diseases.	Total Numbers.	
	Admitted.	Died.
Intermittent fever	19,385	2
Venereal diseases	10,989	—
Continued fever	7,579	11
Wounds and accidents	5,639	7
Abscess and ulcer	4,807	—
Respiratory diseases	4,187	38
Rheumatism	3,298	—
Diarrhœa	2,920	3
Hepatitis	2,845	97
Dysentery	1,962	67
Eye diseases	1,006	—
Remittent fever	842	21
Dengue	675	—
Phthisis pulm.	468	62
Spleen disease	334	1
Enteric fever	264	105
Apoplexy	249	94
Cholera	202	134
Delirium tremens	189	6
Small-pox	22	—
Scurvy	14	—
All other causes	10,897	—

The total admissions were 78,773, and the total deaths 886, both out of an average strength of 57,858, and there were 3,277 men constantly in hospital. There were no less than 30 suicidal deaths during the year.

These numbers show clearly the relative importance of different inefficiency causes in British troops. The febrile group gave rise to 28,070 admissions, and 139 deaths, and next in order come venereal diseases, with 10,989 admissions, not a very hopeful result of Contagious Diseases Acts. Next to cholera, enteric fever was the principal death cause, a fact which shows how small has been the advance made in discovering its localizing conditions. Apoplexy and delirium tremens, both of them, especially the second, the results of poisoning by alcohol, destroyed no fewer than 100 men,—a company. The large consumption mortality, 62 deaths, argues the presence of the latent disease in recruits. Among the secondary results of alcohol and free living may be placed hepatitis and dysentery, from which 164 men died, so that to drink and overfeeding must be set down 264 deaths out of 886, besides the loss from invaliding arising from unregulated personal habits among the troops.

5. *Invaliding.*—The total invalids embarked from India in 1876 were 2,276, or 38·9 per 1,000 strength. Of these, 1,736 or, 29·67 per 1,000, were sent home for change, and 540, or 9·23 per 1,000, for discharge. The preceding five years' average gives 1,778 men sent home for change and 628 for discharge, so that the returns for 1876 are more favourable. Last year we gave the Director General's statistics showing how the invalids were finally disposed of at Netley, and the facts may be here reproduced to complete the year's account, premising that there is an unexplained difference in numbers embarked :—

1876.

Number embarked in India	2,446
Deaths on the voyage	19
Admitted to Netley	2,144
Transferred to Lunatic Asylum	3
Admitted direct to ditto	78
Died at Netley	24
Invalided to pension, &c.	1,261*

The total loss of effective strength in the Indian Army (British troops) in 1876 was hence as follows:—

Average strength in India	57,858
Deaths in India	886
Deaths on voyage home	19
Deaths at Netley	24
Total deaths	929

equal to a death-rate of 16·05 per 1,000.

The 1,261 finally discharged invalids give an invalid loss on the Indian strength of 21·71 per 1,000.

The final loss to the army strength in 1876 from all causes was, in round numbers, under 38 per 1,000. It was higher than in the preceding year, on account of larger invaliding for pension and discharge.

* Including 79 lunatics.

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The following paragraph quoted from the Report gives the proportion to strength of the chief causes of invaliding in India in 1876 :—

	Per 1,000.
1. General debility	8·99
2. Hepatitis	6·10
3. Diseases of heart and large vessels	3·85
4. Phthisis pulm.	3·18
5. Dysentery and diarrhœa	2·41
6. Rheumatism	2·07
7. Fevers	1·97
8. Secondary syphilis	1·69
Or a total of	30·26
Out of the grand total of	38·90

These are the chief statistical data relating to British troops, and we shall next give a brief account of the more important diseases included in them.

6. Out of the 59 stations and depôts in Bengal Presidency, 20 yielded 114 cholera deaths, and one death took place among troops on march. In Bombay Presidency, 2 stations out of 21 stations and depôts yielded each a single cholera death, and in Madras Presidency there were 10 cholera deaths in 3 stations out of 20, besides 7 deaths among troops on march. Hence the weight of the cholera epidemic of 1876 fell on stations in Bengal Presidency. Of these stations the most severely affected was Peshawur, where there were 39 deaths. The hill station and depôt at Murree had 29 deaths. More than half the Bengal mortality occurred at these two stations.

There is no account of the sanitary conditions under which these deaths took place, and a similar deficiency exists as regards other attacked stations. Mr. Townsend merely gives the local histories, leaving the sanitary details apparently to the local Commissioners.

7. The next most fatal disease, enteric fever, occasioned 63 deaths at 27 Bengal stations, and one death on the march. Eight Bombay stations yielded 19 enteric fever deaths, besides 3 on the march, and 4 Madras stations yielded 19 deaths from this formidable disease.

The stations of British troops most severely affected by enteric fever were :—

	Deaths.
Secunderabad	14
Fyzabad	11
Indore	8
Ferozepore	6
Lucknow	6
Poona and Kirkee	4
Cherat	4

One half the enteric fever mortality took place at these seven stations.

But the disease was widely scattered all over India, and affected more stations than cholera. No account is given of the local or personal causes of this disease, which, properly speaking, are subjects of inquiry by Army Medical Officers. Mr. Townsend makes the remark that "this great prevalence "in certain stations of a disease so dependent on local insanitary conditions as enteric fever calls for "close inquiry. One of the most unsatisfactory features of the subject is the increasing prevalence "of the disease in hill stations."

We have often called attention to this subject, but no very distinct account either of the history of the cases classed as enteric fever, or of their local causes, have been as yet supplied. It has, however, been stated more than once that the same measure which is applicable to typhoid fever in this country is not applicable in India, and that malaria must be admitted as a factor in the causation there.

The following monthly abstract of admissions from paroxysmal and enteric fevers will show what relation existed between the two diseases in 1876 :—

——	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Intermittent	1,028	1,085	704	746	1,279	1,227	1,384	2,072	2,584	2,586	2,232	1,458
Remittent	23	25	35	47	74	56	52	76	107	201	94	52
Enteric	25	12	11	15	41	20	19	28	40	25	12	16

The months of maximum prevalence of enteric fever were May to September inclusive. The months of maximum prevalence of remittent were from May to December, and the same rule holds as regards intermittent. But so far as relative monthly numbers are concerned, the correspondence between enteric and intermittent attacks is not very marked; still, there may be an ætiological relation between the fevers, but the facts as they stand again indicate the need of inquiry.

It is of great importance, not only for sanitary purposes in India, but for elucidating the ætiology of typhoid fever, that the circumstances attending every case should be most carefully investigated on the spot and at the time. There is a very general opinion prevalent in England that typhoid fever is either the result of some filth-cause in air, earth, or water, more especially of sewer air, or that it arises from enteric poisoning, while in reports received from India it is made equally evident that typhoid fever cases have occurred at stations where no such conditions existed, and where, moreover,

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typhoid symptoms have apparently been superadded to cases of ordinary malarial fever, so that typhoid cases of this class have been reported as terminations of marsh fever in certain constitutions. This matter is obviously of the greatest importance to the sanitary improvement of stations, and the time has certainly arrived when a distinct reply should be given to the question why at an attacked station enteric fever cases had occurred? It may be suggested :—

1. That whenever a case of typhoid fever has taken place minute inquiry should be made as to whether there was any possibility of its having been due to any filth-cause of the kind specified in any barrack or hospital, or in any bazaar or Native town to which the patient had resorted, or if the case appeared to commence like, and go through the phenomena of, typhoid, *i.e.*, enteric fever, in the absence of any known filth-cause, whether the fact would not suggest the query,—does not malaria sometimes give rise to a form of fever exactly like enteric fever?
2. Whether in the absence of any facts of the kind stated, the typhoid condition was simply developed out of ague or remittent fever, and if so the history of the transition should be given.
3. If there was any such transition, then the state of the barrack or hospital and of the subsoil under and around it should be examined and described, for there is reason to believe that local malaria proceeding from damp walls and floors, and from the immediately surrounding subsoil, exercises a not unimportant influence on the frequency of paroxysmal fevers, and it may be also on the supervention of typhoid symptoms.

8. Paroxysmal fevers occur at every station of British troops in India, but their degree of prevalence varies remarkably in different districts. The lowest admission-rate (except Port Blair) was 74·6 per 1,000, at Rangoon, and from this point there was a gradual ascending admission-rate to 1,592 at Nowgong.

The hill station of Kangra yielded 1,557 per 1,000, and Peshawur, which had an admission-rate of 33·7 per 1,000 from cholera, had a very low fever-rate for the station, namely, 1,043 per 1,000. As strikingly contrasted fever rates we may cite Fort William with 158½ per 1,000, and Barrackpore, only a few miles up the river, which had a fever admission-rate of 1,275 per 1,000. The great contrasts between stations, of which these cases are only samples, point clearly to local causes as influencing the amount of febrile disease. This result is in no way invalidated by great variations of the annual fever rates at the same station, because, although purely climatic causes, such as moisture, temperature variability, all exert their influence in determining the amount of fever, underlying them all are the soil conditions. It may be suggested whether some inquiry might not be made into this element as it exists at Fort William and Barrackpore, between which there can be no great difference in the elements of climate. Any way it is perfectly safe to state that the real cure for local ground malaria, unless troops are barracked above its influence, is drying the subsoil and aërating it, and these excessive fever rates give a clue to the stations which ought first to be improved in this matter.

9. *Venereal diseases.*—This subject has been so fully discussed on other papers that it is scarcely necessary to refer further to it, except to put on record the following statistical facts from the present Report.

The admissions per 1,000 strength are given as follows for 1876, and for five preceding years :—

	1876.
Bengal	195
Madras	184
Bombay	179
India	190

	1871.	1872.	1873.	1874.	1875.	1876.
India	196	179	166	192	205	190

But there is another account of the admissions given in the Report which may be thus summarised :—

Table showing the admissions from *all classes* of venereal diseases in 1876.

Diseases.	Bengal.		Madras.		Bombay.	
	Admissions.	Ratio per 1,000.	Admissions.	Ratio per 1,000.	Admissions.	Ratio per 1,000.
Primary syphilis	2,215	59·8	675	60·5	611	59·2
Gonorrhœa	3,780	100·7	884	79·3	849	82·2
Phymosis	24	9·6	4	8·4	5	8·4
Stricture	147		36		50	
Warts, &c.	111		17		12	
Orchitis (gonorrh.)	72		37		20	
Total	6,299	170·1	1,653	148·2	1,547	149·8
Secondary syphilis	784	21·2	329	29·5	285	27·6
Inflammation of inguinal glands	537	26·3	238	32·2	230	30·4
Orchitis	436		121		84	
Total venereal affections	8,056	217·6	2,341	209·9	2,146	207·8

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The practical result for 1876 of lock hospitals was hence, that there were 12,543 admissions from primary, secondary, and other venereal affections, or nearly 217 per 1,000 strength.

Averages of this kind, however, give a very imperfect insight into the questions connected with these diseases. Every station of British troops throughout the East supplied venereal admissions. Calicut, a small station (93 men) had the smallest proportion, namely, 32·3 per 1,000. From this point the proportions increase by hundreds until they culminate in the enormous figure of 593·3 per 1,000 at Benares. The facts only show how little dependence can be placed on averages in discussing the incidence of syphilis among troops. The station, with the minimum amount, has no lock hospital. The question must be left for the present with these remarks, until measures lately resolved on by the Government of India, and discussed on other papers, have had a fair trial.

10. *Health of European Officers.*—The strength of British Officers in India (whether on leave or not), and out of India, was as follows, together with the death-rates :—

	Strength 1st July (in India).	Deaths in India.		Deaths out of India.		
		Number.	Ratio per 1,000.	Strength.	Deaths in England.	Deaths at Sea.
British	1,737	27	15·5	292	8	2
Indian	1,372	19	13·8	467	12	1

The total deaths among 3,868 Officers were 69, = a death-rate for the year of 17·8 per 1,000. Six of the deaths in India were accidental, and one was a murder. There was one death caused by typhoid fever, four by remittent. Two deaths are assigned to enteric fever, and four to cholera.

11. *Health of Women and Children.*—In 1876, out of a strength of 6,050 women, the death-rate, including 2·98 from cholera, was 20·83 per 1,000. The death-rate from childbirth was 2·64 per 1,000, and from dysentery, 2·15 per 1,000. Four women died of enteric fever.

Among 11,882 children the death-rate, including 1·60 from cholera, was 55·88 per 1,000. The effect of age is shown by the fact that above 77 per cent. of the total child mortality took place at and under 18 months of age.

There were 2,488 infants at and under this age, of which 472 died out of a total mortality of 663. Among the other children the death-rate was 22·53 per 1,000. There was one death from enteric fever.

These statistics show progressive improvement in the health of women and children. Nearly 40 per cent. of the children's mortality was due to ordinary children's diseases, diarrhœa, dentition, and convulsions. Attention may be again called to the comparative absence of fatal children's epidemics. There was no death from scarlet fever, and only one from diphtheria. Measles, which were epidemic in Bengal, caused 27 deaths all over India, and whooping-cough five deaths. There were no deaths from small-pox. As in previous years, the children's epidemic in India was measles, from which one child in every 444 died.

12. Attention may be again called to the relative proportion of enteric fever deaths among three classes of persons in the Indian Army, in contrast with the death-rate among British troops. It is as follows :—

	Enteric Fever Deaths, 1876.	Ratio per 1,000 Strength.
Troops	105	1·82
Officers	3	0·96
Women	4	0·66
Children	1	0·09

The enteric fever deaths among Officers are in about half the ratio of those among troops. But the men's wives and children taken together yield a ratio of one enteric fever death to seven enteric fever deaths among the men. Surely this enormous difference in susceptibility admits of being accounted for.

13. *Native troops.*—The sanitary history of Native troops having been referred to the Commission on other papers, it will only be necessary at present to give the leading statistical facts regarding these troops, in Bengal Presidency briefly, as follows :—

Average strength	39,494
Deaths	446
Died per 1,000	11·29
Daily sick per 1,000	39
Admitted to hospital per 1,000	1,414·8

The chief admission cause was intermittent fever, from which there were 32,050, or 811½ per 1,000 strength, received into hospital. There were 15 admissions from enteric fever, of which six proved fatal. The total fever admissions were 32,405. There were 73 deaths from cholera in the Presidency Native Army. One in the Central India Force, and 29 in the Punjab Frontier Force, = 103 deaths in all.

The chief admission cause was fever. At Ferozepore the fever admission-rate was 3,123½ per 1,000 strength. At Mooltan it was 2,241 per 1,000, at Dum Dum 2,113. There were 16 stations at which the fever admission-rate exceeded 100 per cent. The chief death causes were respiratory diseases (91 deaths), cholera (73), fever (77), phthisis pulm. (36), dysentery and diarrhœa (58).

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14. *Jails in Bengal Presidency.*—The average strength of prisoners in 1876 was 69,771. The daily sick were 33 per 1,000.

The death-rate, including 4·21 per 1,000 from cholera, was 37·51 per 1,000. All the rates were higher than during the preceding year. The chief admission cause was fever, from which 457 per 1,000 were received into hospital. The total admissions were 1,017 per 1,000.

The death-rates showed the usual great differences between jails. The following classification of rates will afford a sufficient illustration of this fact:—

Death-rates per 1,000.	No. of Jails.
Under 10	15
10 to 20	34
20 „ 30	26
30 „ 40	24
40 „ 50	16
50 „ 60	7
60 „ 70	10
70 „ 80	3
80 „ 90	5
90 „ 100	3
100 „ 150	8
150 „ 200	3
Above 200	1

In one jail (Stroncha), the whole mortality appears to have been due to cholera. In some jails the mortality from cholera was, no doubt, excessive, but if it were all deducted it would still leave a general death-rate above 33 per 1,000.

The chief death cause was bowel disease (diarrhœa and dysentery), as will be seen by the following abstract:—

	Deaths per 1,000 Prisoners.
Diarrhœa and dysentery	14·75
Respiratory diseases	5·45
Cholera	4·24
Phthisis pulm.	3·24
Fevers	2·36
Atrophy and anæmia	2·19
Others	5·28
All causes	37·51

There are no details given of the sanitary condition of these jails capable of accounting for the extraordinary variations in the death-rates. The Acting Sanitary Commissioner calls attention to another important fact, namely, that the mortality among prisoners is 2½ times greater than the mortality among sepoys; and he says that, "excluding the jails of Bengal Proper, the prisoners are "less liable to cholera than the Native troops, and the mortality among prisoners from fever was in "1876 very little in excess of the mortality from the same cause among the sepoys; the diseases that "contributed to raise the mortality among the prisoners above that of the sepoys were bowel com- "plaints, phthisis, atrophy and anæmia, and dropsy, diseases attendant on and aggravated by poverty "and insufficient food; and we found, moreover, that in almost all the jails which exhibited high rates "of mortality these diseases were the chief components of the death-rate, and that in nearly all these "jails the majority of the prisoners who died had been in very indifferent health when imprisoned." This, no doubt, is true, but it scarcely accounts for the high and variable death-rates, or proves them to have been inevitable. It is certainly not the experience of jails in England, the inmates of which are not selected because they are in good health, and yet it is a notorious fact that the home jail population is among the most healthy part of the people.

We have often referred to this subject, and, in the absence of local information as to the state of jails and their surroundings, we must leave the facts to make their own impression.

15. *General population.*—Taken over the whole of India the registration of deaths appears to be improving, although in some parts of the country it is still very defective. The following instructive table given in the Report shows clearly the extent and results of the registration machinery up to the present time:—

Provinces.	Registration Circles.			Population.			Deaths per 1,000.		
	Rural.	Town.	Total.	Rural Circles.	Towns.	Total.	Rural. Circles.	Towns.	Total.
Bengal	1,185	78	1,263	57,967,982	1,976,517	59,944,499	15·98	28·73	16·40
Ditto, selected areas	76	119	195	4,877,996	2,002,533	6,880,529	19·11	32·98	23·15
Oude	103	29	132	11,301,730	653,955	11,955,685	17·56	29·27	18·21
North-West Provinces	813	66	879	28,605,214	2,163,842	30,769,056	22·70	32·47	23·39
Punjab	426	208	634	15,453,367	2,033,758	17,487,125	26·	46·	28·
Central Provinces	156	72	228	6,926,283	481,191	7,408,074	28·86	52·08	30·38
Berar	102	32	134	1,902,869	282,076	2,184,945	31·4	35·2	31·9
British Burma	14	14	28	2,541,087	325,486	2,866,473	—	—	14·79
Assam	—	—	—	—	—	—	—	—	9·33
Madras	172	74	246	28,443,692	1,835,211	30,278,903	—	—	23·34
Bombay	223	42	265	14,337,872	1,890,902	16,228,774	—	—	21·81

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Leaving out Assam, for which reports had not been received, there are 734 town registration circles, and 3,270 rural circles, making death returns. The towns have a population of above 13¼ millions, and the rural circles of above 172¼ millions.

The registered death-rates are much higher than they used to be; although the great differences in the ratios show how much requires to be done before the registration is satisfactory. The results are, nevertheless, hopeful.

16. The next abstract gives the chief death causes all over India, so far at least as these can be recorded at present:—

Province.	Deaths per 1,000.						
	Cholera.	Small-pox.	Fevers.	Bowel Complaints.	Injuries.	All other causes.	All causes.
Bengal (selected areas) -	3·35	·39	13·09	1·86	·99	3·47	23·15
North-West Provinces -	·85	1·14	16·10	2·88	·43	1·96	23·39
Punjab - - -	·33	·59	20·09	1·56	·27	5·57	28·41
Central Provinces - -	2·71	·51	20·22	2·70	·45	3·78	30·38
Berar - - -	1·2	·2	18·2	7·5	·4	4·4	31·9
Oude - - -	1·84	·47	13·61	·61	·43	1·25	18·21
British Burma - -	1·28	·46	8·62	1·83	·17	2·40	14·78
Assam - -	2·26	·88	4·63	1·12	·19	·75	9·33
Madras - - -	5·08	·8	7·8	1·3	·3	7·8	23·3
Bombay - - -	1·90	·7	13·08	1·99	·36	3·78	21·81

It will be seen that the chief death cause everywhere is the group of diseases classed as "fevers," and that other causes are subordinate.

The Punjab and Central Provinces with their fever death-rate of 2 per cent. are the most feverish provinces, while Madras and British Burma are the least exposed to fevers.

The low fever-rate of Assam, rife with malaria and its consequences, is the result evidently of defective registration.

The Report contains nothing regarding the causes of these fevers which has not been already noticed on other papers. Fever deaths were returned from among a population of about 182½ millions, and the number of fever deaths registered was no less than above 2¼ millions. In the present state of the registration of fevers it is sufficient to give a general estimate rather than details, especially as the registered fever deaths exceeded considerably those of the preceding year.

17. *Cholera.*—A considerable part of Mr. Townsend's Report is devoted to the topographical history of cholera in the provinces of India, but as this subject has been dealt with on other local papers, it will only be necessary at present to state the general results for the whole of India.

Cholera deaths were returned from a population exceeding 196 millions, and the deaths registered in 1876 were 486,134, as compared with 384,421 for 1875, and 81,226 for 1874. Much of the apparent increase appears to be due to better registration of deaths.

The disease was more or less prevalent over a large area of India. Returns from 237 districts into which the country is divided show that cholera deaths were registered in all except 21. In many districts the disease passed over from December 1875 to January 1876. In the latter month there were fatal cases of cholera registered in all the divisions of India, except in Berar, and in Rajpootana and Central India.

The map appended to the Report enables the prevalence of cholera by months to be easily realised. Beginning with Tavoy, in the State of Pegu, and following the coast line, the dates of prevalence are,—

Tavoy - - - - -	January.
Amherst - - - - -	March.
Rangoon - - - - -	January.
Bassein - - - - -	,,
Ramree - - - -	April.
Akyab - - - - -	March.
Chittagong - - - -	January.
Coast of Ganges Delta - - - -	,,
Calcutta - - - - -	,,
The east coast of India and Ceylon - - -	,,
The whole west coast to Guzerat - - -	,,

In many inland points in Lower Bengal and Assam it prevailed in the same months.

The disease appeared in force in the interior at later dates, but it appears to have had its own history and progress in each marked topographical region. As regards season, Mr. Townsend expresses the opinion that "the variations in the prevalence of cholera follow so closely the changes of the season in "different parts of India that it is impossible to reject the inference that there exists some relation "between them. On the other hand, we find cholera prevailing under such totally opposite conditions "of atmosphere, and its incidence on population is so partial and uncertain, that we are driven to the "conclusion that the action of these atmospheric states on the human system is not direct, but through "the medium of some one of the conditions, it may be of soil, or it may be of water-supply, under "which the individuals or populations affected are living." And his conclusion is that, "although the "disease may occur under any state of the weather, the atmospheric condition most frequently "attending its prevalence is that of great heat and dryness; that the condition which, after heat and "dryness, favours the spread of cholera is rainfall; but that, although the action of rainfall on the "prevalence of cholera may be at first favourable to it, it is in the end antagonistic, and tends to bring "about its subsidence."

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" There seems to me," he says, "little room for doubt that the influence of these opposite conditions " on the prevalence of cholera is due to their action on the water-supply of the people. It may seem " too much to say that wherever cholera prevails, impure water is present as one of the factors of the " epidemic ; that the half million of deaths from cholera registered in India in 1876 would not have " occurred had the water-supply of the people been pure and sufficient, but the incidence of cholera " on the population is evidently dependent on the presence of some specific insanitary condition;" and he considers that all the terrestrial and atmospheric surroundings were conducive to the contamination of the water-supply.

Topographical conditions and atmospheric changes have always been considered as influencing predisposition to epidemic attacks when epidemics are about, but no doubt, also, dry weather, in a country where sanitary precautions are neglected, indicates increasing impurity of water sources, which may be further increased by the first rain washings of a foul surface getting into water sources. There is, besides, abundance of direct evidence of water impurity in cholera-affected districts.

18. *Small-pox and Vaccination.*—There were 104,029 registered small-pox deaths all over India in 1876, of which 10,746 took place in Bengal. The number of vaccinations for the whole of India are not given, but for Bengal Proper the vaccinations successfully performed are returned at 919,770, or nearly nine-fold the number of small-pox deaths. The total cost was 10,580*l.*, or about 2¾*d.* per case.

19. *Bowel complaints* caused 299,926 deaths. The highest death-rates from the diseases classed under these heads were in Berar. There were in this province 9·53 bowel complaint deaths per 1,000 in 1875, and 7·50 per 1,000 in 1876, nearly eight times the proportionate mortality from these diseases in Bengal. The local causes of bowel complaints, like those of fever, require further investigation. Little has yet been done to account for the great mortality from either.

20. *Military sanitary works in Bengal Presidency.*—During the financial year 725,917*l.* were expended under this head, of which 307,859*l.* were for new works. These have been new barrack blocks, camping grounds, drainage, water-supply, &c. The Peshawur water-supply scheme has been making progress. Umballa has received a water-supply for cantonments of from 50,000 to 90,000 gallons per day. The drainage of British Infantry lines at Meean Meer has been completed, and the water-supply commenced. Dalhousie water-supply is nearly completed. Several new hospitals have been commenced or completed.

The question of water filtration is still unsettled.

A very important step has been taken by the Government of India in directing the appointment on trial of local committees for the purpose of examining into the sanitary condition of Native villages in the vicinity of cantonments, with the view to enlisting the inhabitants in the work of improvement.

21. *Civil sanitary works in Bengal Presidency.*—There is little to report under this head beyond what is contained in the reports of local Sanitary Commissioners, which have been already referred to the Commission, and no remark is called for on the subject. The striking facts regarding "mahamurree" (a true filth plague) are noticed in our remarks on the North-West Provinces Report.

22. As Mr. Townsend's Report is confined chiefly to sanitary statistics there is nothing in it calling for special remark. Its importance lies in the nature of the statistical facts themselves, which, as discussed by an independent and experienced officer, afford strong confirmatory evidence of the sanitary evils prevalent all over India, the effect of these on the public health, and the necessity of unremitting exertion in cleansing towns and villages, and in improving the drainage and water-supply. The facts also show the progressive reduction in military death-rates, consequent on improvement in stations ; but the Report, as a whole, proves the necessity for special inquiries into what diseases are classed as "fever" and "bowel complaints," which at present are by far the most important death causes in India, in order that their removable conditions may be assigned and dealt with.

So far as relates to British troops, the facts already given concerning the prevalence of enteric fever, not only at plain stations, but even on the hills, together with the known relation between this fever and common filth causes affecting air, earth, and water, render it a matter of imperative necessity that special inquiry should be at once instituted into the whole subject, and that measures should be adopted, without delay, for eradicating this pest so far as it may be possible to do so.

Cholera in relation to certain physical phenomena (*Appendix* A.)—This paper contains an instalment of the Cholera Inquiry into the relation between atmospheric and soil meteorological elements and cholera mortality, carried out by Drs. Lewis and D. Cunningham.

Although the results are mainly of a negative character, the facts arrived at are of considerable interest and importance, chiefly because they have thrown light on a subject that has not been dealt with so fully before in India, and, up to a certain point, they enable us to clear away some indefinite impressions as to the relation of cholera to these elements, so that, to a certain extent, their negative relation to epidemic prevalence may be arrived at. The inquiry is not completed. Indeed it may be considered rather as clearing the ground for more definite investigation.

The details are voluminous, and are illustrated by tables and diagrams, which can best be studied in the Report itself. All that is proposed to do at present is to give a brief account of the nature of the inquiry, together with the leading results of it.

The chief part of the investigation relates to cholera in Calcutta, because the monthly incidence of the mortality can be there ascertained for a sufficient period to be adopted as a ground of proceeding. Dr. Macpherson's tables for 26 years, and Mr. Payne's tables for 12 years, are first discussed, and the month of November is assumed for a starting point as being the month of average cholera prevalence. Having arranged the months, the reporters show the relation by tabular statements and curves between the atmospheric pressure, temperature, humidity, and cholera mortality.

The elements are compared singly and in combination. Next follows the rainfall and its relation to cholera prevalence, and then the important questions connected with subsoil water level, and its relation to rainfall and cholera. Next, the relations to cholera of soil temperature, the amount of carbonic acid in the soil, and the amount of soil ventilation of which the carbonic acid (6 feet below the

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surface) is taken in some sense as a measure, *i.e.*, the larger the amount of carbonic acid the less is the soil ventilation. By dividing the cholera year into three seasons, the following tabular facts are reduced to show the relation between the meteorological data and the amount of cholera for seasons and typical months:—

Meteorological Conditions.	Seasons of Prevalence.			November.	April.	August.
	Medium.	Maximum.	Minimum.	(Medium).	(Maximum).	(Minimum).
Atmospheric pressure - -	29·88	29·806	29·614	29·98	29·757	29·608
„ temperature - -	75°·4 F.	81°·1 F.	83°·3 F.	74°·9 F.	84°·7 F.	83°·1 F.
„ humidity - -	74	70	87	71	73	88
Rainfall - - - -	3″·81	2″·51	12″·17	0″·66	2″·49	13″·71
Water level - - -	12′·7	14′·4	10′·4	11′·5	14′·6	9′·5
Soil temperature - - - -	77°·9 F.	77°·0 F.	81°·8 F.	78°·1 F.	78°·8 F.	81°·7 F.
Carbonic acid in soil, air, &c. - -	4	1	4	5	1	5

The meteorological elements in this abstract are too limited as to time for purposes of absolute comparison. Taken as they stand they may be read as follows:—

1. Atmospheric pressure least during cholera minimum.
2. Temperature lower in minimum than in maximum month, and lower in the maximum than in the minimum season.
3. Humidity considerably greater in minimum than in the maximum periods.
4. Rainfall five-fold greater during minima than during maxima.
5. Subsoil water level between four and five feet lower in minima than during maxima.
6. Soil temperature highest during minima.
7. Amount of carbonic acid in subsoil four or five times greater during periods of minimum prevalence of cholera, and hence the subsoil ventilation is freest during maxima.

This last element, which is one apparently of considerable importance in the discussion, requires further examination, because, if it can be depended on, it would apparently lead to the conclusion that the rapid passage upwards of soil air, and what this air may contain, has an important bearing on cholera prevalence.

The reporters themselves state the results in the following words:—"The season of minimum "prevalence is, according to these data, characterised by low atmospheric pressure, high atmospheric "and soil temperatures, by extreme atmospheric humidity and rainfall, by elevation of the water level, "and by obstructed ventilation of the soil, as indicated by the amount of carbonic acid. The season "of medium prevalence is characterised by high atmospheric pressure, low atmospheric and soil tem- "perature, by minimum humidity and rainfall, by depression of the water level, and by obstructed "ventilation of the soil. The season of maximum prevalence shows characters occupying an inter- "mediate position in regard to those of the other two seasons, except in so far as its water level and "soil ventilation are concerned. . . . According to these data the depression of the water level "and the increase of soil ventilation are the only phenomena which reach a climax during the season "of maximum prevalence of cholera."

Conditions of this class are, of course, materially influenced by the nature of the subsoil itself, and would scarcely apply in rocky or stony ground, or in outbreaks of cholera in northern latitudes during intense frosts, but still the facts are important and merit further investigation.

They appear to hold good over the districts of Bengal, which have been examined, at least, within limits; for in some of the elements there is little agreement at particular stations in the north-west of India.

In applying the facts, so far as they have been ascertained, to practical use, the reporters examine the leading theoretic doctrines about cholera in the light of the facts, and they arrive at the following conclusions:—

1st. The doctrine of the propagation of cholera from person to person is inconsistent with the observed facts of the disease, for "the maximum prevalence in Calcutta occurs during a period when "there is less crowding together or close association of the population than in either of the periods "preceding and following it."

2nd. The "cholera water" theory is not sustained by the meteorological elements, because the largest washing of cholera-polluted surfaces into drinking-water tanks co-exists with periods of cholera minimum.

3rd. For similar reasons applicable in the dry season the effect of impure water is not proved by the course of the disease, at least altogether. The maximum of cholera does not coincide with the driest times, when the water may be taken to be most impure.

4th. The soil theory. This, although receiving countenance from the facts regarding soil ventilation already cited, does not fulfil all the conditions required, "and all that can be positively affirmed "is, that the difficulties opposed by the phenomena of periodic fluctuation in the prevalence of "cholera in Calcutta to the soil theory are less than those encountered by any of the other current "doctrines regarding the essential cause of the disease."

On this subject the following important remarks must be here introduced from the report of the observers:—

"The nearer the soil of a district of India approaches in character that constituting the lower portion "of the Gangetic plains, the greater is the likelihood that cholera will be found as an endemic disease "in it. . . . The seasonal manifestation of cholera changes gradually as we proceed up the river, "the disease manifesting a tendency to be deferred later and later in the year the further the affluents "of the Ganges are followed towards their sources, and the drier the climate and the soil become, so "that in the upper part of India and in the Central Provinces the maximum prevalence of the disease

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" occurs just at those periods when the soil conditions most closely approach those in Calcutta when " in its driest state, viz., during and towards the end of the rains, at which period alone the soil " conditions of the former area approximate to those in Lower Bengal during the greater portion of " the year." And they conclude that the soil theory is most in accordance with the phenomena.

The deduction follows that there is a close relationship between the soil conditions which generate malaria and those which accompany cholera; that the origin of malaria has been recognised; and that the course of malarial fevers is often not less difficult to account for than the course of cholera. The facts, as they stand, may be assumed as a starting point for further inquiry.

Another class of data bearing on the subject is given by Mr. Townsend in his Report, namely, the relation of the direction and force of winds to the amount of cholera mortality. Such, for example, as the preponderance of cholera deaths in the Ganges Delta when winds are blowing from southerly directions, except in November and December, the great fatality in Patna and surrounding districts during the prevalence of easterly winds, and the apparent augmentation of mortality by increased force of these winds. This may be suggested as a point for further inquiry, as bearing on the question of transported malarial influences.

Enough has been said to show the advantage of continuing these investigations, but the necessity may be at the same time suggested of keeping clearly in view, in all such inquiries, the fundamental distinction between the real, yet unknown, cause of cholera, and the conditions which influence its prevalence in a country. It may be asked whether all of the facts brought out in the present Report do not really come under the last of these classes, and whether underlying them all there is not the epidemic itself. If this view be correct, then the real practical result of the whole is the argument which it supplies for pressing forward with sanitary improvement in subsoil cleansing, draining, and water-supply; the striking results of which in the case of cholera in Calcutta, the reporters fully recognise.

There is one other point to which the notice of the reporters may be called.

They state in a foot note that, as regards seasons, " mere *range* of temperature exerts no appreciable " influence on the prevalence of cholera." But it may be suggested whether the fact of *daily range* ought not to be compared with the *daily* cholera mortality.

A given seasonal range may be made up of maxima and minima.

Under the former there may be ranges between day and night of, say 50° F., and under the latter of 20° or 30° F. The question to be determined is the effect, if any, of the higher ranges of variation day by day, and this might be obtained from the temperature tables, and from the daily cholera mortality.

21st June 1878.

No. 2.

MEMORANDUM of the ARMY SANITARY COMMISSION on the REPORT of the SANITARY COMMISSIONER for MADRAS for 1876.

1. Two out of the ten sections into which Mr. Cornish's Report for 1876 is divided relate to questions connected with British and Native troops and lock hospitals. But as these subjects have been dealt with in separate papers, the present remarks of the Army Sanitary Commission will be confined to practical sanitary points relating mainly to the civil population, for which mortality statistics have been returned. The census population in 1871 was 31,597,872, but the births and deaths are returned from 29,157,056 only.

2. Among the latter population the births registered in 1876 were 632,113, showing a slight falling off from the numbers of 1875, but at the same time a progressive increase over preceding years.

The deaths registered among Natives (excluding dead-born) were 680,384, the largest number ever returned.

The ratios of births and deaths registered per 1,000 of the population were,—

Births - - - - -	21·6
Deaths - - - - -	23·3

showing an excess of deaths over births of 1·7 per 1,000.

Commenting on the imperfections of both results, Mr. Cornish makes the following pertinent remarks, which, as coming from an officer of experience, merit the attention of the authorities in India:—

" I would submit that, in the interests of the people themselves, the legalization of the system of " birth and death registration is now becoming a necessity. * * * It is well known that evidence " in regard to age in our law courts is always extremely unsatisfactory, * * * whereas if the " parties wanting reliable evidence of age had a village register to appeal to, future generations " would be spared these difficulties. The birth or the death of an individual in a law abiding and civilised " community should be capable of proof from official records, and all that is wanted in this respect is " to extend the law already in force in towns under municipal government to village communities." This registration could probably be done without expense by the people themselves. It is satisfactory to know that in Bengal the registers are beginning to be referred to in courts of justice on these points.

The death registration is much more satisfactory in the municipal towns, in which it averaged 30·9 per 1,000 in 1876.

The death statistics, Mr. Cornish informs us, foreshadowed towards the end of the year the approaching famine. The deaths registered in October were 45,053. In November they were 56,511, but in December the mortality made a sudden bound to 88,027.

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" It was in the last two months of the year that the influence of famine and of the diminishing " food supplies, and of the throwing the labouring classes of certain districts out of work, began to be " felt."

3. The following were the deaths registered from the chief death causes during the year :—

	Registered Deaths.
Cholera	148,193
Small-pox	23,469
Fevers	230,092
Bowel complaints	38,176
Injuries	11,175*
All other causes	229,279

The year 1876 was marked by a great increase of the total mortality over the mean of the previous five years, which amounted to 18·1 per 1,000.

But it is doubtful whether the average registered deaths of these years gave the whole truth. All that can be said, is that the death-rate of 1876 is apparently more correctly given than the rates of preceding years.

4. Taking the diseases in the order given in this tabular abstract, we find that 1876 was marked by great mortality from cholera over the preceding year. The epidemic of 1875 which was discussed in our Memorandum on the Madras report of last year covered nearly the whole of the Presidency, and caused a total mortality of 94,657 deaths. Mr. Cornish informs us that in the beginning of 1876 cholera prevailed in almost every district, and the statistical data in the Report give the following as the monthly mortality from cholera during the year :—

Months.	Cholera Deaths registered.	Months.	Cholera Deaths registered.
January	14,607	July	18,641
February	11,683	August	10,363
March	8,299	September	5,265
April	10,834	October	3,280
May	11,463	November	7,894
June	14,681	December	31,183

The explanation given by Mr. Cornish of the greatly increased mortality at the end of the year is as follows :—" I have no doubt that the cholera mortality in the end of the year was largely aggravated " by the sudden rush of people to the famine relief works. They were employed chiefly in road " making, and in localities where the water-supply was scanty and bad, and so thickly were the roads " covered with labourers that sanitary precautions in regard to conservancy and protection of sources " of water-supply could not be enforced ; amongst the road camps of relief labourers cholera was very " fatal in Kurnool and Bellary."

We have in this experience another pointed testimony to the fact that the aggregation of masses of human beings in India without due regard to sanitary precautions is a cause of aggravated cholera mortality, and it follows that by the exercise of sanitary foresight the mortality might have been averted. The point in regard to which we are not in a position to give an opinion is whether in the presence of so great and rapid an influx of starving people, it would have been possible to have foreseen and avoided the results.

5. The following abstract of an interesting set of tables shows the distribution of cholera mortality in 1876 :—

Districts.	Total Number of Villages and Towns.	Total Population of all Villages and Towns.	No. of affected Villages and Towns.	Population of affected Villages and Towns.	Cholera Deaths.	Deaths per 1,000 of Population of affected Villages and Towns.
Ganjam	5,174	1,210,256	388	393,399	3,926	9·9
Vizagapatam	2,915	1,598,527	161	276,134	1,273	4·6
Godavery	2,128	1,620,684	711	806,687	6,977	8·6
Kistna	2,141	1,452,066	637	702,618	6,727	9·5
Nellore	2,184	1,145,873	737	755,876	8,385	11·0
Madras town	37	397,552	37	397,552	2,105	5·2
Chingleput	2,394	934,523	273	278,205	1,950	7·0
South Arcot	3,118	1,755,324	1,188	1,028,458	9,543	9·2
Trichinopoly	1,674	1,199,155	678	784,833	5,274	7·1
Tanjore	3,967	1,972,820	1,147	1,052,512	8,015	7·6
Madura	1,224	1,327,899	294	606,824	2,703	4·4
Tinnevelly	1,849	1,693,629	625	1,108,074	6,195	5·2
Kurnool	787	914,232	433	762,560	11,758	15·4
Cuddapah	1,811	1,350,967	671	989,142	11,574	11·6
Bellary	2,543	1,665,815	966	904,043	16,129	17·8
North Arcot	5,214	2,014,254	641	1,166,288	14,975	12·8
Salem	5,312	1,966,362	1,402	1,379,406	14,759	10·7
Coimbatore	1,579	1,762,679	380	606,647	4,049	6·6
Neilgherries	20	47,366	4	21,935	25	1·1
South Canara	1,291	918,042	156	206,371	618	2·9
Malabar	436	2,253,258	292	1,557,938	11,303	7·2

* Of these deaths 2,108 were caused by snake-bite, and 269 by wild beasts.

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This table includes 47 municipal towns besides Madras. The number of affected villages and population is the sum of the monthly totals in the tables, hence the actual number of villages attacked and escaped cannot be deduced from it; the tables merely state that in the course of the year 1876 so many villages suffered monthly. The abstract, excluding Madras town, gives the following results. Total villages, 47,241; population, 27,303,637. Total municipal towns, 47; population, 1,600,044. Of these villages and towns cholera was present at some time or other in 11,816, or nearly 25 per cent., having a population of 15,410,100.

Cholera deaths in attacked villages and towns were 146,158, or 9·4 per 1,000 of the attacked population. Perhaps a better idea of the distribution of cholera in 1876 may be obtained from the following monthly abstract:—

Months.	Villages affected.	Approximate per-centage of total Villages 47,241.	Months.	Villages affected.	Approximate per-centage of total Villages 47,241.
January	2,304	4·9	July	2,881	6·1
February	1,938	4·1	August	1,844	4·0
March	1,493	3·1	September	1,065	2·2
April	1,559	3·3	October	655	1·4
May	1,920	4·8	November	1,151	2·2
June	2,441	5·2	December	3,895	8·3

When compared with data supplied by epidemics of less intensity, these facts regarding the Madras epidemic of 1876 show that the increase of mortality depended on a greater proportion of villages having been attacked, and on a larger average of deaths in the villages. The epidemic thus covered a larger area, and was of a more fatal character.

The Sanitary Commissioner considers the cholera of 1876 as representing the second year of a new epidemic invasion "aggravated by the abnormal seasons and general scarcity of food, and in some "degree also by the aggregation of the people on famine relief works."

Among the general aggravating causes of mortality was the state of the water-supply, which in famine districts was almost invariably scanty and bad, "and when thousands of dirty people were "collected on road works, and the wells few and far between, it is no matter of surprise that the "sources of supply became polluted so as be active factors in the propagation of cholera."

6. There is no account given of the state of attacked villages, but from a special case presently to be noticed some idea may no doubt be formed of their condition.

Although sanitary improvements have not as yet made much progress in municipal towns, there are nevertheless points of comparison between their cholera death-rates and those of villages which are not devoid of interest. Of the municipal towns two or three escaped cholera, while the death-rate from this disease in the towns was about 5·8 per 1,000, as against 9·4 per 1,000 in towns and villages together, and, as will be seen afterwards, those towns which spent most in sanitary work had the lowest death-rates.

7. The special reported case of an attacked village alluded to above was of Kanakkampatty, in Salem district; but in order to understand it we must connect the facts with those showing the course of the epidemic in the district. The municipal town of Salem has a population of 49,873, from among which there were 516 deaths from cholera, or 10·3 per 1,000. There were cholera deaths in the town every month except September. Salem district has a population of 343,584 located in 636 villages. Of these villages 306 were attacked, and 335,991 people in them furnished 3,412 cholera deaths in the year, = 10·1 per 1,000. Cholera existed in the district villages during every month in the year. In January there were 303 cholera deaths in 46 villages with a population of 55,852, and in February, during which Kanakkampatty was attacked, 61 villages, with a population of 86,159, yielded 286 cholera deaths. It is necessary to note these facts, as they have an important bearing on certain views on the cause of this cholera outbreak stated by the Acting Sanitary Commissioner, Dr. King, who was directed by Government to "make a thorough investigation," and the following foundation is apparently the one on which this important duty was based:—"The notion that cholera is not so "communicable" (*i.e.* from man to man), "although unfortunately entertained by some physicians of "experience, would be in the present state of our knowledge ridiculous if it were not pernicious." The reporter then proceeds:—"The disease was introduced by a man who, coming from the "Darampuri taluq to a wedding, spent the night before his arrival in a cholera infected village. He "was taken ill at Kanakkampatty but recovered. The next attacked was a girl, an inmate of the "house in which the wedding was taking place; she also recovered, but never left the premises while "her illness lasted. Those who believe that the disease is propagated by the excreta of patients will "not be surprised to hear that ten other inmates of this house died of cholera."

The reporter further expresses his opinion that the survivors carried cholera in their flight to other villages. Such is the account given by Dr. King of the origin of cholera in this village. Subsequent enquiry, however, showed that the first case took place not in a man but in a girl who was attacked on the 3rd February, two days after her arrival in the village, but recovered, and moreover it turned out that the wedding did not take place, "owing to the spread of cholera in the village."

The following facts, given by the local Native official who replied to certain questions sent to him by the Sanitary Commissioner with the Government of India, go far to clear up the case, and to show that altogether, apart from any views about contagion, there was in all probability a direct relation between the outbreak and a bad sanitary state of the village.

The village of Kanakkampatty, with 48 houses and 202 inhabitants, was one of 61 villages in which cholera existed in February 1876 in Salem district. The case of the girl who recovered took place

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on February 3rd as already stated. The following was the subsequent history of cholera in the village:—

	Deaths.
February 6th	2
„ 7th	7
„ 8th	9
„ 9th	10
„ 10th	11
„ 11th	7
„ 12th	3
„ 13th	2
„ 14th	2
„ 16th	2
„ 17th	1
Total	56

There can be no question of the virulence of an outbreak of which 56 people out of 202 died in 11 days. The "survivors," however, did not fly, only five of them, of whom however three died in a neighbouring village where they had taken refuge. No account is given of what took place in this village (Kumathore), so there is nothing to support Dr. King's statement that the survivors carried the disease "to other villages."

We have seen that cholera existed in great intensity in Salem district; considering, however, the smallness of the village and its position on high ground, it possibly might have escaped if it had been in good sanitary condition. But no account is given by Dr. King of the state of the houses except that they are placed irregularly, and separated by very narrow tortuous lanes and small yards in which cattle are kept.

There is no water in the village, and the supply for domestic use was obtained from a small "guntah" about 30 feet square, 100 yards away, and considerably lower down, into which flows the surface drainage (as is supposed) polluted by excreta and washing of clothes. This water was used up to the 12th February, after which other well water was provided, and the Native official states that "no cases of cholera have since occurred." The information as a whole is far from being sufficient to account for the severity of the outbreak, but accepting the facts as they are, they appear to bring the case within the usual category of Indian village attacks, and among other causes they appear to justify (so far as the facts go) the opinion expressed by Dr. Cornish himself that "the use "of impure water in this case must have contributed to the number and fatality of the cases." But there is no sufficient evidence that the outbreak was due to importation. The dates and facts of the epidemic are against this view, and the statistics show that the outbreak followed the usual course of epidemics in a sudden rise and slower decline. It is, moreover, quite possible that the girl's case might not have been cholera, or that it might have been really due to the state of the house she went to, and to the use of impure water. She is said to have passed through villages where cholera was at the time, but there are neither dates nor detailed facts to show the relation of this circumstance to her own illness, neither is any information included in the Report to show the relation of her attack (or even the nature of it) to other attacks in the village. It would have served the object of the inquiry directed by Government much better if the sanitary state of the village and houses had been thoroughly inquired into, and if the cases were really connected with that of the girl it is obvious (as long since pointed out in our Instructions for the Cholera Inquiry) that every step of the evidence connecting her case with the other village cases should have been given. As the case stands, it must be classed, for practical purposes, not amongst those in which the outbreak could have been avoided by isolating the village, for the whole country was suffering from cholera, but as affording an additional illustration of a long known truth, that when cholera is about its intensity may be indefinitely augmented by breathing filthy air, living on foul ground, and using filthy water.

8. That part of the Sanitary Commissioner's Report which relates to cholera is deficient in information as to the state of attacked villages, and the measures required for their improvement, and a similar remark applies to the part which relates to fever and other endemic diseases.

The only cholera case in which an inquiry was made ended in nothing, because it was based on a theory about cholera. It is quite clear that no single person could accomplish the requisite inspecting work, especially during epidemics, and that some inspecting and advising agency is required. Such an agency already exists in the vaccination service, which, if properly directed, could be of immense public good by advising the village populations on measures for protecting their own health, and reporting to Government the state of villages and the means required for their improvement. In this way a public opinion might take root all over the country, which in time might lead to sanitary work. The vaccination establishment consists of the following officers:—

1	Inspector.
27	Deputy Inspectors.
10	Assistant ditto.
123	First-class Vaccinators.
282	Second-class ditto.
Total	443

It is not too much to say that every one of these officers might do real sanitary work, and contribute to the protection of the public health, without in the slightest degree interfering with his vaccination work, which in reality is by itself a sanitary proceeding, although a subordinate one in

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the face of the fever and cholera epidemics, which sap the energy and destroy the productive power of so large a proportion of the rural population.

The small-pox mortality in 1876 was 23,469, including Europeans. The cholera mortality among the same group was 148,322, and the fever mortality 230,181. To these should be added bowel complaints, which gave 38,285 deaths.

All these diseases are more or less mitigable or preventable. Their conjoint mortality was 440,251, only 53 per 1,000 of which was due to small-pox, for the special prevention of which 443 officers are employed; and, notwithstanding the high death-rates from them, the Report gives no information on their removable local causes, while as regards diseases classed as fevers there is nothing said about their real nature, without some knowledge of which effective sanitary measures can scarcely be taken. The logical result of the facts appears to be that with a limited agency available more good work would be done for the public by turning the energies of the officers solely to sanitary improvement. But, as already stated, this course is not necessary, and the Commission would suggest for consideration whether the course long ago pointed out by them for utilising the vaccination service for general advising and reporting sanitary purposes would not be of great public benefit, without adding to the public outlay. The vaccination service itself has done good work during the year, by performing 483,192 operations, but even at this rate, which is the highest ever reached, it would take 66 years to protect the present population, even if all remained alive, and as small-pox, like all epidemic diseases, depends for its intensity very much on the general sanitary condition of the people, we have, in the fact, an additional reason for extending the utility of the vaccination department. The details of this work could readily be settled by Mr. Cornish himself.

9. Section VIII. of the Report contains a brief abstract of returns filled up at 36 military stations in Madras Presidency, but the information supplied by them is too limited to enable any practical estimate to be formed as to their sanitary condition.

The most satisfactory point in them is the comparative exemption of troops from attacks of cholera, at a time when cholera was generally prevalent, and giving rise, as we have already seen, to great mortality among the civil population. At Bangalore there were 1,641 British troops, among whom not a single case of cholera took place. There was one death from among 1,992 Native troops, and yet the civil population of Bangalore and the surrounding districts suffered. The death-rate from cholera in Bangalore registration circle is given on the map as 6·9 per 1,000. Considerable sanitary improvements have been already carried out at this station, and new waterworks were in progress. Famine relief labour had been employed in general improvements, but it is stated that the Native lines require gradual rebuilding. The notorious Ulsoor tank had been deepened and embanked.

At Secunderabad there were 3 deaths from cholera among British troops, and 11 deaths among women and children. There were 7 cholera deaths among Native troops. Enteric fever gave rise to 31 cases and 11 deaths among British troops at this station. No cause is assigned for these losses, although it is evident that a searching inquiry and report is called for. It appears that in only two regiments has the dry-earth system been adopted, and it might be useful to inquire whether these regiments suffered equally with the others.

The Secunderabad water-supply is reported as "indifferent and scanty." The Report is otherwise of no use in leading to practical improvements. We must again call attention to these defects, and we would suggest whether such occurrences as those at Secunderabad and some other stations mentioned in this Report should not be made the subjects of inquiry at the time, bearing in mind that the object in view is to ascertain to what removable causes attacks of enteric fever and cholera among troops are due, and that in no case should merely theoretical considerations enter into the question.

10. *Civil Sanitary Works.*—This section of the Report gives a brief digest of the nature of sanitary works carried out in 45 municipalities out of 47. None of them are rich. One of the richest and most populous is Bellary. It has 51,766 inhabitants, and an income of 6,411*l.* per annum, of which 2,757*l.* are spent for sanitary purposes. In the majority of instances only a few hundreds of pounds are annually spent on the public health; most of the work is cleansing, and it is satisfactory to know that the favourable relation between expenditure for sanitary work and the public health has been again shown by the experience of 1876. Mr. Cornish states the case as follows:—

"Taking 30 per cent. of the income as the maximum and 20 per cent. as the minimum of sanitary "expenditure, in 12 towns which expended on an average 35·7 per cent. of income for sanitary "purposes in 1876 the death-rate was 28·7, and in 12 other towns whose expenditure averaged 15·7 "it was 37·7. Eliminating cholera from the calculation in both instances, which always forms an "unfavourable factor in death ratios, the results are still in favour of the towns whose sanitary "expenditure exceeded 30 per cent. of the income, the death-rates being 22·5 and 28·4 respectively. "Thus it will be seen that in towns where more money was spent for conservancy purposes and "cleansing a lower death-rate has resulted."

As affording additional encouragement to the prosecution of sanitary improvements in Madras Presidency, especially among the civil population, the following striking contrasts in cholera mortality in 1876 are introduced:—

	Deaths per 1,000 Strength.
British troops	1·57
Native troops	1·74
Central jails	1·20
Civil population in attacked villages and municipal towns	9·4

The first three groups in this list show the influence of improved sanitary conditions during a great epidemic of cholera, in localities where these have been more completely introduced.

The death-rate among the civil population illustrates rather the force of the epidemic in 1876 than the effect of sanitary work, and hence the importance of the contrast.

Of sanitary works properly so called not much is said. Besides conservancy and cleansing, the chief steps in the way of improvement appear to have been cleansing or providing new wells and tanks,

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road and surface drainage improvements, latrines and market accommodation. At present by far the best drainage for these municipal towns is surface drainage carried along streets and roads with drains of impervious material, having a shallow saucer-shaped transverse section. All covered drains should be avoided.

So far as the facts in these municipal reports enable a practical conclusion to be arrived at, they show:—

(1.) The supreme importance of conservancy and cleansing. All putrescible refuse of men and animals should be continuously collected and removed away from human dwellings. For cleansing purposes small public latrines, to be emptied daily, are best for health. Where people resort to the outskirts of villages for natural purposes the deposits should be covered with earth, by some local arrangement.

(2.) No cesspits or middens should ever be allowed within municipal limits, and any which exist should be abolished forthwith.

(3.) Every water-source should be protected from impurity, and all culinary water-sources should be used for only these purposes. All wells for common use should be covered, ventilated, and otherwise improved, in the way advised by us in our note on the subject at page 167 of Vol. IX. of the India Office Sanitary Reports, 1875–76.

(4.) Surface drainage by shallow impervious drains would probably be best for these small Madras municipal towns at present, in the hope that, in time, the whole question of town and house drainage and sewerage may be ready for further discussion. It is satisfactory to know that in other parts of India the subject has been under consideration. At the present time, partial and imperfect attempts at sewerage may do more harm than good, and most probably they would have to be undone at some future time.

11. *Local Fund Circles.*—Besides municipal towns, there are 34 Local Fund Boards in the 20 districts in the Presidency, which are presided over by the Collectors. These circles appear to furnish no reports. Their available income is 121,425*l.*, of which 33,480*l.* are allotted for sanitary purposes. They appear to be beyond the reach of any advising or inspecting agency, and, as the case stands, the cholera mortality among them must be taken in some sense as a measure of their sanitary condition rather than of their work.

Lastly. The facts as a whole lead to the same result as those derived from the villages, namely, that the Sanitary Commissioner should have the means placed at his disposal for fulfilling the practical duties of his office. No man, be he ever so zealous, could do much real sanitary work for 29 millions of people. It is quite enough for him to superintend and advise, and he should have the means of doing so placed at his disposal. In this way occasional inspections would enable him to overtake more work, and as already stated the vaccination service is there to assist.

The necessity for some re-organization and extension of the sanitary service in Madras Presidency is, indeed, the principal outcome of Mr. Cornish's present Report.

31st May 1878.

No. 3.

Memorandum of the Army Sanitary Commission on the Report of the Sanitary Commissioner for Bombay for 1876 (together with Reports by the Sanitary Commissioner on Military Cantonments and Civil Stations inspected during 1875–76).

These Reports, prepared by Mr. Hewlett, Acting Sanitary Commissioner for Bombay Presidency, are contained in two large folio volumes, prefixed to the first of which is a Resolution of the Government of Bombay likely to have an important bearing on future sanitary work in the Presidency.

The Sanitary Commissioner, Mr. Lumsdaine, finding that the relation of his office to other departments was unsatisfactory, drew up a memorandum on the subject, and the Government thereupon issued the Resolution referred to on 23rd August 1876, in which they declare that the Sanitary Commissioner is the adviser of the Government in matters concerning the public health, and that as such "he will "exercise a constant oversight upon the sanitary condition of the people, European and Native, and "the districts generally." He is to receive early information from the authorities of everything likely to affect the death-rate. He is to advise and report on disease prevention. He is to exercise a general supervision of sanitary improvements in cantonments, towns, and villages, and is to be kept informed on contemplated improvements, including water-supply projects for towns, camps, &c., whether for irrigation or for general purposes, and also on all drainage schemes. He is to supervise sites and plans for buildings where there are no standard plans, and also as regards their water-supply, drainage, and ventilation. He will advise on questions regarding offensive trades, disposal of dead, conservancy, disposal of sewage and refuse, and also as regards pilgrim encampments. He will receive copies of all reports on sanitary subjects before proceedings are taken on them. Municipalities and Cantonment Committees are advised to communicate with the Commissioner and the engineering service on comprehensive schemes for sanitary improvement, such schemes not to be departed from when once fixed upon without valid reason. The Sanitary Commissioner to report on all inspections and in detail on sanitary defects and the required improvements. This report to be submitted to the Municipality or Cantonment Committee. Such works as are most urgently required to be pointed out and discussed. Resolutions arrived at to be sent to the Sanitary Commissioner for submission to Government, with a copy of his own report and remarks on the resolutions. Lastly, at the end of each year, Medical Officers who are members of Cantonment Committees are to include in their reports the improvements which have been carried out; and the Sanitary Commissioner is "invariably" to report on the same subject and the character of the work done.

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Mr. Hewlett's Report for 1876 is apparently prepared in compliance with these requirements, and the result even for the first year shows the advantage of the steps taken by the Bombay Government. But besides this, the year 1876 has seen "the creation of a Sanitary Department" in utilizing the vaccination service for sanitary work, and Mr. Hewlett says he firmly believes that future annual reports will show "that the cause of sanitary reform throughout this Presidency has been greatly aided "by the advice on sanitary matters which its officers (vaccination service) will from time to time give "to the local authorities."

This great change proposed by the Army Sanitary Commission several years ago will thus have supplied the Presidency with sanitary advisers in every locality where vaccination is carried out.

1. The Report is divided, as usual, into separate sections for meteorology, European army, Native army, jails, general population, history of chief diseases, vaccination, sanitary works (military and civil), and the usual statistical tables.

The information regarding European and Native troops has been discussed on separate papers referred to the Commission, and will only require a passing notice. On all other topics, as well as those specially connected with the Bombay Army, Mr. Hewlett's Report is distinguished by a real practical grasp of detail. Every section of it shows evidence of this fact, and the local authorities ought to have no difficulty in becoming acquainted with the local disease causes, and in applying the required remedies.

In a memorandum such as the present it would be impossible to follow up the details: all that can be done is to discuss the general results of Mr. Hewlett's facts for the year, and his proposed measures of improvement.

2. In the meteorological section of his Report, Mr. Hewlett calls attention to the necessity of tree planting as a means of equalizing water-supply and improving health, and he introduces an interesting paper by Dr. Gray, Professor of Botany at the Grant Medical College, in which the subject is fully discussed. Long ago the importance of tree planting and conservation was urged by the Commission on the twofold ground that in moist, undrained localities trees took up 200 lbs. of water for every pound of wood grown, and that in districts of little rain the amount of rainfall might be increased by trees, and the supply to springs and river-heads could be equalized, and thus both droughts and floods might be modified. On this matter Dr. Gray's paper deserves careful consideration.

3. On the subject of water-supply for irrigation, Mr. Hewlett says:—"I regard the construction of "the large lakes and canals that are now being made as famine relief works as one of the greatest "benefits that has ever been conferred on this country." The Commission is, however, desirous of again directing attention to the fact that such drainage works as careful examination may show to be necessary in connection with irrigation should be provided, to avert the loss of life and the large outlay which would eventually be required to stay the ravages of malarial fevers, as shown by the experience of other districts of India.

4. *European Army.*—The mean average strength of the European army in 1876 was 10,116, and the sanitary statistics were as follows:—

	Number.	Per 1,000 strength.
Admissions	13,328	1,317·5
Daily sick	540	53·4
Deaths	125	12·36
Invalided for change	—	37·27
„ for discharge	—	10·38

The total immediate loss was thus 60·01 per 1,000 strength, but this includes all men who, on arrival in England, would be fit to rejoin their depôts.

Malarial fevers were, as usual, the chief admission causes. There were 4,860 admissions from these fevers, 480·4 per 1,000 strength.

Next in order of frequency were venereal diseases, from which the primary infection admissions were 1,816, = 179·5 per 1,000 strength. There were 994 admissions for wounds and accidents, 484 for diarrhœa, 406 for hepatitis, and 271 for dysentery.

5. The following were the chief death causes:—

	No. of Deaths.	Deaths per 1,000.
Injuries	18	1·77
Enteric fever	16	1·58
Heart disease	12	1·19
Respiratory disease	10	·99
Phthisis pulm.	9	·89
Dysentery	6	·59
Suicide	5	·49
Malarial fevers	3	·30
Hepatitis	2	·20
Apoplexy	2	·20
All others	83	8·20

6. The proportionate amount of one important disease type has diminished materially of late years. Thus, in 1871 the admissions from malarial fevers were 691·6 per 1,000 strength. There has been a persistent reduction since that year, and in 1876 they had fallen to 480·4 per 1,000.

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On the other hand, admissions from venereal disease have been as follows:—

	Number.	Ratio per 1,000.
1871	1,891	174·4
1872	1,675	154·8
1873	1,931	181·1
1874	1,798	170·8
1875	1,776	174·4
1876	1,816	179·5

The mean of five years' admissions (1871–5) from hepatitis was 44 per 1,000, and in 1876 the ratio was 40·1. Dysentery admissions had fallen from a five years' mean of 27·5 per 1,000 to 26·8 per 1,000 in 1876.

One of the most important death causes, enteric fever, gave rise to 16 deaths in 1876 as against an average of 17 deaths for the previous quinquennial period.

7. One or two remarks on personal causes of disease require notice.

In the Bombay Army, of 10,165 average strength, there are 972 total abstainers, while the average number of men drawing liquor daily was 7,592. The average consumption of drink per man per diem was about a pint and a half of malt liquor, and three ounces of spirits, apparently. Under this *régime* there were 4,065 cases of drunkenness reported during the year. 9,374 cases of crime, = to 92·22 per cent. of strength, were punished by the Commanding Officer. 504 men were tried by court-martial, and 262 men were sent to the hills. The 2nd Battery, 6th Brigade, Royal Artillery, had 88·61 per cent. of its men reported for drunkenness; and as if to show that there must be means of dealing with such disgraceful cases, the F Battery, 9th Brigade, Royal Artillery, had a proportion of 3·71 per 1,000. Mr. Hewlett very properly says: "I think the above statement should lead the authorities to forbid "the issue of spirits at the canteen. All the Medical Officers I have consulted are unanimous in "condemning the issue of spirits." In order to prevent the men getting bad bazaar liquor, he suggests that suddur distillation should be prohibited within 20 miles of a large military cantonment, and that all retail dealers should be compelled to dilute their spirits. "Such a law is much needed regarding "the civil population." On the physical and moral evils of spirit drinking, especially in Indian climates, there is no difference of opinion, only little or nothing has apparently been done to abolish the practice. It appears to be just in the state it was when it met with well merited condemnation by the Royal Commission on the Sanitary State of the Indian Army 15 years ago.

8. As regards the prevalence of venereal diseases, which is a matter closely allied to intemperance, Mr. Hewlett, after commenting on the amount of these affections among troops, notwithstanding the institution of lock hospitals, states that, in his opinion, "the real measures to adopt lie in quite another "direction. I am certain," he says, "that the enforced idleness of the life the British soldier leads "in India tends very materially to the prevalence of both drunkenness and incontinence, and that "the only effectual remedy for diminishing the large annual loss of service to the State from each "of these vices is to afford the men such healthy employment as will occupy their minds, and so lessen "the temptation to commit them." This was the view of the Royal Commission, stated 15 years ago. The remedy has never been properly tried, and, despite all other measures, drunkenness and vice are as rife as they were; the State suffers in service and the Army in health.

9. A few remarks on the chief death causes may be here introduced.

Cholera.—In the preceding abstract of deaths no notice is taken of cholera, although it existed in an epidemic form in the Presidency, and caused 32,117 deaths among the civil population.

There were only five cases of cholera among British troops, of which two proved fatal. The cholera death-rate among the Native population was 1·90 per 1,000, and among British troops it was 0·19, or just a tenth part, a sure proof that much has been done to improve the sanitary condition of barracks and stations. This comparative exemption of British troops did not proceed from the absence of cholera in their vicinity, for the towns near stations gave death-rates of from 2 to above 18 per 1,000.

Enteric fever.—As already stated, there were 16 deaths from this disease in 1876. The cases and deaths took place at the following stations:—

	Strength.	Ratios per 1,000 strength.	
		Attacks.	Deaths.
Asirgurh	44	22·7	—
Aden	720	2·8	1·39
Poona	1,510	6·6	2·65
Ahmedabad	263	7·6	3·80
Baroda	212	14·1	4·71
Mhow	1,153	6·9	1·73
Neemuch	410	17·1	17·07
Hyderabad	360	2·8	—
Nusseerabad	640	4·7	—

The only station in the list which is reported on by Mr. Hewlett is Poona, and there are facts sufficient, connected with the drainage and other arrangements at the station, to render the conclusion highly probable that the enteric fever which has attacked troops on successive years at this station is due to patent sanitary defects.

It may be suggested whether a special sanitary inquiry and report might not be called for in every case of enteric fever. In 1876, for every death from cholera there were eight deaths from enteric fever in British regiments serving in Bombay Presidency, and enough is already known regarding this fatal

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disease at Indian stations to show that there ought to be little difficulty in tracing its causes either within the limits of barracks or in places outside resorted to by the troops. If an exhaustive sanitary report were appended to each case it would soon be known to what extent climatic causes, with or without the co-operation of local filth and damp, contribute to the development of enteric fever.

Paroxysmal fevers.—Mr. Hewlett calls attention to the fact that subsoil malaria, the result of want of drainage, is a universal cause of these fevers all over the Presidency. He says: "The inspections I have "made have most strongly impressed on my mind the absolute necessity that exists in this country, 1st, for "lowering the water level and for aerating the ground around habitations by deep subsoil drainage, "and, 2nd, for providing surface drainage for the rapid removal of the storm water; and, 3rd, for the "introduction of pipe sewers through which the excreta and sullage could be at once carried away "from the vicinity of dwellings, where they do harm, to the land, where they do good. At present, "the monsoon rain drips from the eaves of nearly all military buildings, barracks, hospitals patcherries, "&c., in the Presidency, and soaks into the already saturated ground, and, in too many cases, the "water level under the ground on which they stand rises to within a very short distance of the "surface." As illustration of this point, he mentions the case of Sattara, where the men had suffered very much from fever, and where water flowed from under the barrack in a strong stream at the time of his visit; and also the damp ground under and about the Officers' lines at Ghorpuri, which he describes as "fever nests."

10. From this description the important question long since discussed by the Royal Commission on the Sanitary State of the Indian Army, and provided for in our various memoranda and suggestions, namely, the influence of damp subsoil on malarial diseases, and the manner of dealing with it, remains just where it was. Mr. Hewlett expresses his surprise at this after all these years of discussion and the numerous printed documents which have been issued on the subject. But his explanation of the fact is scarcely less surprising than the fact itself, for he says:—"I believe I am right in stating that, most "unfortunately, these publications have not as yet reached the libraries of those gentlemen entrusted "with the execution of public works in this Presidency." Unless there is some misunderstanding in this matter, it is evident that grievous oversight and neglect is chargeable somewhere. He proceeds to say that he "is convinced, if the Government were pleased, to order the circulation of these books, the "cost thus entailed could but be productive of the greatest good in disseminating among these officers a "knowledge of the true principles regarding the sanitary construction of buildings and of those "structural works and measures which are absolutely necessary to improve the health of communities, "whether in this country or elsewhere."

This subject is one which it may be suggested requires serious attention, for it is certain that these documents were drawn up with no other object than to point out to officers charged with the duty the remedies required for removing defects such as those, which we are informed after all these years are still lowering the health and efficiency of Her Majesty's Indian Army.

11. *Drainage of buildings.*—Even attempts which have been made to drain buildings have been of very doubtful utility. We are told, for example, in regard to the pipe drainage in use round the new Artillery barracks at Ahmednuggur, that, "it is a wonder that typhoid fever has not ere this broken out." There is no office plan of these drains. The account given of the drainage at the Governor's residence at Gunesh Khind, until Sir Richard Temple came, is scarcely credible. There appears to have been a community of foul air extending throughout the drainage system and every bed room in the house. In this case also, there was no drainage plan, and the only information available was Native oral tradition. With such facts before us it seems doubtful whether, in the present state of intelligence, the execution of drainage works should be encouraged at military stations. A sanitary engineer would put the matter to rights at once, but we have no proof as yet of any really good and efficient drainage having been carried out at any station, although there is no reason, except absence of skill, why every station should not be drained.

It is evident that the work must be systematically undertaken, that the plans should be of the simplest character, and that no communication should be possible between any sewer or drain and any living room or water cistern.

12. Improvements in station wells and in water filtration are still much required, and on this subject we must refer to our note on water filtration, appended to our Memorandum on the Report of the Sanitary Commissioner with the Government of India for 1875 (India Office Sanitary Reports, Vol. IX).

13. On the general question of construction of new barracks and hospitals, Mr. Hewlett states that in no instance has the recommendation of the Royal Commission and of the Army Sanitary Commission to provide the buildings with raised basements, having free passage for the air between the floor and the ground, been attended to.

In none of the buildings has another advised improvement been carried out, viz., the use of roof gutters to carry the roof water away from the ground immediately surrounding barracks, hospitals, and quarters, a matter of such obvious necessity everywhere, but especially in such a climate as that of India, that the neglect of so simple and inexpensive a means of preventing ground damp, is not easily justifiable.

14. Mr. Hewlett condemns "in the strongest manner" the existing practice of disposing of night-soil, which in almost every station is deposited in deep pits, saturating the ground in the vicinity. We have long since laid down the sanitary principles on which this proceeding should be based, namely, that where latrine matter is not conducted away by drains, it ought to be applied directly to the ground for manure by shallow trenches or otherwise, and the ground cropped. If pits are used they should be made watertight and covered until the matter has become decomposed and fit for application as manure.

15. A matter of great importance to the efficiency of Her Majesty's Indian Army is stated as follows:—"The private houses in which Officers are obliged to live in cantonments are, as a rule, very "bad in a sanitary point of view. The landlords will not do anything to improve their condition, "because they know that the Officers have no choice; they must occupy them, as they are the only "ones available."

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Amongst other remedies, Mr. Hewlett proposed that the Cantonment Committee should have power to condemn houses unfit for occupation, and to direct their being rebuilt on proper plans.

As there is a supreme authority within cantonments it might have, besides this power, the right of certifying to the sanitary condition of Officers' houses, and without a favourable certificate no such house should be occupied. It seems to require consideration, that while there are means of ensuring wholesome quarters for private soldiers, no account should be taken of the health of Officers.

16. The sanitary condition of bazaars at some stations is still most unsatisfactory. That at Poona has above 22,000 inhabitants. It is a large temporary town without any of the sanitary requisites of such a place. The difficulty in the way of improvement lies in the inadequacy of funds.

But suppose, on the other hand, that the following principle were enunciated. These 22,000 people live in Poona bazaar for their own benefit, but they live in such a way as to endanger the health of the station which supports them. Why, under these circumstances, should not each household be compelled to do its own part in keeping its house clean and wholesome? In this way every house, compound, and lane might be kept clean daily. If the inconvenience or impossibility of this course be urged, then the obvious reply is that the people must pay in order that others may do their work. If as much money were levied as would enable these bazaars to be kept clean and healthy it would no doubt be cheaper for the people, but if they do not pay, the obvious alternative is that they should be compelled to do the work, which in any case must be done without fail. The principle is that in sanitary matters every one is responsible for his own property, and if other people do his duty he must pay. Anyway, the work should be done, for it is absurd to allow matters to go on as they are. The Poona and other bazaars are stated to be "of the greatest possible danger to the troops," and no doubt they are so. Not only are they redolent of all nuisances, filth, bad water, foul ditches, and the like, but they contain filthy cattle stables, and produce suspicious milk.

17. In concluding this part of his Report, Mr. Hewlett strongly urges the use of hill stations, instead of building costly barracks in doubtful places. We may mention, with reference to the unfavourable comments we have made on certain stations in this Presidency, Nusseerabad amongst others, which have been asserted to be healthy stations, that he advises the abandonment of Nusseerabad for British troops. This opinion is, however, not in accordance with opinions expressed in reports from this station, although the cantonment death-rate is returned at 31·76 per 1,000, of which 11·58 was due to fever.

Details in regard to a number of stations of British troops are included in appended abstracts of reports of Medical Officers similar to those noticed on other papers. Mr. Hewlett's own Report, already discussed, contains the general results of these reports.

18. *Native troops.*—As the details regarding Native troops have likewise been considered on other papers, it will be perhaps sufficient to notice generally the sanitary defects as they presented themselves at stations during Mr. Hewlett's skilled inspections.

The following abstract gives the statistics of the Bombay Native Army for 1876 :—

Strength - - - - - - 22,583

	Number.	Ratio per 1,000.
Admissions - - - -	26,918	1,191·9
Average daily sick - -	856	37·9
Deaths (total) - - - -	296	13·1
Invalids - - - -	—	67·7
Total loss - - - -	—	80·8

The chief admission causes were malarial fevers, of which 13,652 cases were treated; wounds and accidents, which gave 2,885 admissions, rheumatism 1,619, and respiratory diseases 1,419 admissions. There were 768 admissions from diarrhœa, 726 from dysentery, and 95 from spleen disease. The chief death causes were cholera, 53 deaths; respiratory diseases, 46 deaths; malarial fevers, 45 deaths. There were 10 deaths from diarrhœa, and 8 from dysentery.

Malarial fevers, rheumatism, spleen disease, and respiratory diseases are more or less connected with local conditions, and they yielded 15,785 admissions, or 62 per cent. of the total sickness of the year, and nearly half of the deaths took place from cholera, respiratory diseases, and malarial fevers.

19. Bearing these facts in mind, the following are the local conditions to which they are attributed by Mr. Hewlett: "The great cause of the prevailing unhealthiness among Native troops serving in this "Presidency is undoubtedly the unhealthy conditions under which they live, which are, in my opinion, "the existing cause of the malarial fevers and respiratory diseases which cause such a serious loss "of service to Government year by year in this branch of the service."

One of the conditions referred to, namely overcrowding of lines, has not perhaps hitherto received the attention it merits. It appears that the hut accommodation gives 100 square feet and 1,250 cubic feet per man at Poona, not too much in the locality. The total regimental strength is 744; but the total inhabitants amount to 1,663. Taken by area, the crowding of these sepoys' lines is represented by 91 when compared with 41 in London. It is at the rate of 58,414 persons per square mile. The evil to be dealt with in this matter is an administrative one, because we could not advise that the accommodation in the sepoy's lines should be made sufficient to afford healthy space for all he may choose to bring within their precincts. But as Government makes a certain allowance to the men for materials, it seems only right that it should exact such simple conditions in the way of arrangement of huts, ventilation, bathing accommodation, raised floors, dimensions, &c., as would protect the health of the men. There is, in reality, nothing required that is either new, special, or difficult; all that is wanted is that in the work of building certain things should be done and others avoided.

20. Mr. Hewlett insists particularly on the absolute necessity of lowering the subsoil water-level of lines by deep drainage. He says that in the lines of no Native regiment in Bombay is this essential

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matter attended to. Hence damp floors and walls of huts, sodden and unaerated subsoil, producing malaria and a great admission-rate, as we have seen, from paroxysmal fevers.

The latrine accommodation in many cases requires improvement. Shallow trenches covered with earth and cultivated are advised wherever earthy soil is at hand. As a matter of experience, he states that in the commencement of the famine he insisted on this being done at all relief works, "and the "results have been most satisfactory."

On the question of the sepoy's food Mr. Hewlett confirms what has been long stated, "that, as soon "as a recruit is enlisted, a tribe of relatives come and live on and with him," although his pay is just sufficient to sustain himself in health.

Wells in sepoy lines are very liable to pollution by dust, and dirty buckets and cords used in drawing water. We have long since advised the covering of wells, and water drawing by iron bucket and chain, which Mr. Hewlett thinks should be adopted.

21. *General population.*—Registration is still in a very imperfect state in many parts of Bombay Presidency, but the following results may be quoted from the Report.

The estimated population of the registration districts in 1876 was 16,887,728.

The births and deaths registered during the year were:—

	Births.	Deaths.
Males - - - - -	181,872	197,664
Females - - - -	163,612	170,596
Total - - -	345,484	368,260

According to the local estimate of 1 per cent. annual increase of population, it is evident that many births escape registration, and no doubt many deaths likewise. The figures give no indication of rapid increase of population. The following was the registered mortality from the chief death causes:—

	Number of Deaths.
Cholera - - - - - - -	32,117
Small-pox - - - - - - -	11,817
Fever - - - - - - - -	220,833
Bowel complaints - - - - -	33,683
Injuries - - - - - - -	5,928
Other causes - - - - -	63,882
Total - - -	368,260

The total registered death-rate was 21·81 per 1,000, to which diseases classed as "fevers" contributed 13·08, or nearly two-thirds of the amount. The cholera mortality was 1·90 per 1,000, nearly the same amount as that from bowel complaints (chiefly diarrhœa and dysentery), namely, 1·99 per 1,000.

The registration details appear to show that children's deaths to a great extent escape being accounted for. Thus, under the head of infants (children unable to walk) the death-rate is only 4·06 per 1,000 of the total population, and probably it is by keeping this fact in view that a remedy might be applied. Among "children" above this age the death rate increases to 5·53 per 1,000.

22. *Chief diseases.*—The following abstract shows the quarterly incidence of mortality for a five years' average:—

	Epidemics.	Other Causes.	Total.
First quarter - - - -	5,551	71,167	76,718
Second quarter - - -	10,990	68,582	79,572
Third quarter - - - -	10,234	82,758	92,992
Fourth quarter - - -	3,515	83,329	86,844

The relation of season to epidemic prevalence is here clearly shown.

Cholera.—This disease prevailed in an epidemic form in 1875, and caused 47,555 deaths. It passed over into the next year, 1876, and gave a mortality of 32,117, or one-third less than that of 1875. It prevailed in 57 out of 85 circles within 20 districts in the Presidency out of 24.

The affected districts contain 144 towns with a population of about 2½ millions. Of these towns 87, having a population of 1,933,111, were attacked and yielded 4,518 cholera deaths in 1876=1·49 per 1,000. In the same districts there are 23,115 villages, with a population above 11¼ millions, of which villages 2,146 with a population of 2,183,361 were affected. The cholera deaths in these attacked villages numbered 20,260=9·28 per 1,000 of the inhabitants. It follows that above 60 per cent. of the towns, and 9·2 per cent. of the villages were attacked, and that out of a total population of 23,798,979 living in 23,259 groups, 17·3 per cent. yielded cholera deaths. There is no reliable information given by local officers about the disease. Two or three attacks are attributed to importation; but no trustworthy facts are given. One local officer, who rests his views on assumed contagion, says that "the disease was very capricious in its attacks. Villages notoriously dirty and squalid were "spared, while others equally known for cleanliness were attacked." This, however, does not appear

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to be Mr. Hewlett's opinion, for he says: "The lesson I have learnt from these outbreaks, as well as "from all other outbreaks that I have seen in my Indian experience, is that, leaving theories to be "discussed by those who have not more earnest work to do, it is perfectly clear that cholera is a filth "poison, and that where filth exists in food, water, air, or soil, there the ravages of this disease are "worst, *supposing* the factors necessary for its movement are also present. What all these factors are "no man alive knows, but it is sufficient for practical purposes to know that filth is one of the "prime movers of cholera, and that the surest preventive against outbreaks of the disease is that at all "times and all seasons the inhabited area should be kept free from filth, whether consisting of garbage, "sullage, or excrement, and that the provision of a pure water-supply and of wholesome food, and "means of effectively and rapidly removing all effete matters, are necessary if the ravages of the disease "are to be stopped," and he very properly adds that "there ought to be no change required in the "execution of sanitary works, no extra precautions to be taken when cholera comes."

These views are put forward by no theorist, they are fruits on the contrary of long experience, and they really contain the fundamental sanitary requirements for every town and village in India. They have been long known in this country, but it is of great importance to have this decided testimony from one of Mr. Hewlett's knowledge and experience of sanitary work in India, and it is to be hoped that local officers will turn aside from theories and trust for the future protection of the people to real sanitary improvements. We would suggest that the attention of the vaccination service should be specially directed to Mr. Hewlett's experience.

Fevers.—The civil fever mortality (220,833 deaths) was the largest ever registered. It contains a constant element of fallacy in that the designation includes all diseases with heat of skin, pneumonia, pleurisy, and the like. These febrile diseases gave rise to 59·67 per cent. of the total deaths of the year.

No account is given of the local causes of these fevers, but they are no doubt connected with damp, unwholesome dwellings, and local malarial causes, which it is hoped the new sanitary organisation will bring to light.

A similar remark applies to diseases classed as *bowel complaints.*

Among other death causes attention may be called to the fact that 1,164 persons died from snake-bite, and 94 from wild beasts; and that of 1,892 persons who died by drowning, 839 deaths took place in wells, and 374 in tanks, together 1,213 deaths in water sources. We have long called attention to this subject, but the number of drownings in water sources appears to have undergone no material diminution. Snake-bite deaths continue much the same.

23. *Vaccination.*—The vaccination service appears to be conducted with its usual energy. The total vaccinations, including re-vaccinations, amounted last year to 815,177, as against 808,353 during the previous year. The increase is important, because 1876 was the first year during which the vaccination service undertook general sanitary inspecting work. Referring to this subject, Mr. Hewlett says: "Much good work was done during the year by the superintendents of vaccination, who, during their "tours, inspected the various towns and villages in their districts, and brought to notice the insanitary "condition of many of them," they also tested the accuracy of registers and inspected dispensaries. A proper form was to be issued for reporting the sanitary work, but so far it is satisfactory to see that no diminution in the numbers vaccinated had taken place, but the contrary, and the Government has thus obtained the services of a large sanitary staff without much, if any, additional cost.

The Bombay vaccination staff now consists of:—

5 Deputy Sanitary Commissioners.
4 Superintendents.
26 Inspectors of Sanitation and Vaccination.
7 Assistant Inspectors.
406 Vaccinators, besides clerks and peons.

When suitable relations have been established between this large staff and the Sanitary Commissioner, and also with the local and village authorities, so that practical effect may be given to the advice and assistance rendered, there cannot be a doubt that great benefit will result from the change.

24. *Sanitary works executed.*—The information under this head is much fuller than usual, and shows that progress is being made, although not so rapidly as might be desired.

Under Section VIII. (*Sanitary Works, Military*), the sum of 69,691*l.* has been expended at 32 military stations, and the details are given in reports of executive Royal Engineers. The details consist mainly of surface drainage works, improvement in wells, three new barracks at Ahmedabad with the floors raised five feet above the ground (an important structural improvement), removing old buildings, erecting additional buildings, and improving others. And a number of proposals for further sanitary works are contained in the reports, and are under consideration.

It would be very desirable, as suggested by Mr. Hewlett, that a thorough trial should be made of efficient subsoil drainage at some one station where malarial disease is prevalent, and where the work can be carried out. We have long since proposed a trial of this kind, but up to the present time the chief dependence for removing subsoil water has been laid on surface cuts of greater or less depth, and these, unless, so constructed as to prevent the water from soaking in the subsoil, may readily serve no other purpose than increasing its dampness.

On other matters of detail we would advise that our Suggestions for the Sanitary Improvement of Indian Stations be referred to, for according to Mr. Hewlett's account they are not to be found at the stations.

25. *Sanitary Works, Civil.*—These form the subject of Section IX., and the details are given in the returns of sanitary works executed by municipalities, &c., for the benefit of the civil population; preceded by four reports of great importance to future sanitary work in India, drawn up by Major

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Ducat, R.E., showing the plans and details of waterworks carried out by him for supplying the following towns with water:—

	Population.	Outlay.	Daily supply in Gallons per Head.
		£	
Pen - - - -	6,000	2,800	26
Alibagh - - -	5,500	3,400	16
Kolhapur - - -	40,000	25,388	6¾*
Jamkhandi - - -	12,000	5,201	10

* From storage tank.

These towns are in the Colaba Collectorate, and the great boon of a pure water-supply to each has been carried out under the auspices of the Collector, Mr. Arthur Crawford, C.S.

We are glad to learn that the town of Sattara, which has a bad water-supply, has a scheme similar to Mr. Crawford's under consideration. The example he has set in his Collectorate is in every way worthy of imitation by others, and it is to be hoped that in time other improvements may be initiated besides improved water-supply by the local officers.

26. The municipal reports are furnished by 170 municipalities in 22 Collectorates. Of these municipalities, 31 report no completed works during the year, and 139 report the execution of works of various classes more or less connected with sanitary improvement. The chief improvements mentioned are those connected with roads, surface drainage, guttering, repairs and deepening of wells, tanks, and water cisterns, surface cleansing, latrines, tree planting, road watering, lighting, &c.

The reports are not made after inspection of the work done, they are rather of the nature of returns, but they appear to show that work is being done. Mr. Hewlett says that, in his opinion, reform must commence in the large towns, as in these there is an organized attempt being made, "and reforms are "gradually but steadily being introduced." As a step in this direction, he advises that the Medical Officers stationed in the principal towns should act as officers of health, and be placed under the Sanitary Commissioner. This recommendation is in entire accordance with those made formerly on the same subject by this Commission. If he had time, which is perhaps doubtful, such an efficient agent as the Civil Surgeon ought to be might help in the work. Indeed, it may be stated that some of the earliest and best contributors to the sanitary history of Indian districts have come from among this class of officers.

27. In all this, however, there is no provision made for the sanitary improvement of the great village population of the Presidency, a subject which will have to be dealt with in connexion with the vaccination service and the village officers.

28. *Reports on Military Cantonments and Civil Stations.*—These reports are contained in the second volume of Mr. Hewlett's Report. Four of them, on Tanna, Poona, Ahmedabad, and Ahmednuggur, are reprints of local reports which were included in our Memorandum on the Bombay Report for 1875.

There are also reports on the following cantonments:—

- Sattara.
- Kolhapur.
- Belgaum.
- Dharwar.
- Sholapur.
- Ahmedabad.
- Sirur.
- Poona { Sudder Bazaar. / Native Troops. / European Troops.

And on these Civil stations:—

- Sattara.
- Kolhapur.
- Belgaum.
- Dharwar.
- Sholapur.
- Bijapur.

The reports are accompanied by remarks from local authorities and the decisions of Government on questions raised in them. They display the usual defects incident to Indian communities, such as want of domestic and public drainage, and consequent pollution of subsoil in compounds, under houses, and in populous places; defective cleansing as a necessary consequence of this want; keeping cattle within towns, and even within compounds of houses (a practice leading not only directly to defective cleanliness, but to diseased condition of the animals and to a deteriorated state of milk); deficiency of latrine accommodation; the use of cesspits and consequent danger to the purity of wells; wet subsoil under huts (as in the case of barracks at Sattara Camp, already mentioned, where water was seen flowing from under a hut occupied by European troops who had suffered from fever); the bad sanitary state of bazaars at certain stations (as at Poona, of which the Secretary to Government remarks that, "notwithstanding that the sudder bazaar of Poona is the largest bazaar of the kind on this side of "India,"—it has 22,000 inhabitants,—"that it belongs to the largest cantonment in this Presidency, "and contains within its limits no small amount of wealth, it is deficient in all the main essentials— "with the exception of a supply of drinking water—which would render the sanitary condition of its "inhabitants sound"); the practice of bathing among Native soldiers and their families within dwelling rooms, which, in the absence of impervious floor surface and drainage, leads to constant damp and predisposes to fever; bad construction of huts and defective arrangement of lines; bad sites; defective ventilation in huts and barracks, defects in lavatories, urinals, and cook-houses.

29. It will be seen from this brief outline that the more prominent insanitary conditions in these cantonments and towns are precisely the same as those revealed by the Bombay reports year after year. It is unnecessary to discuss the details of each report, because it is evident that Mr. Hewlett

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has laid hold of the real sanitary deficiencies in each case, and so far as we are able to judge at a distance has pointed out the practical remedies. His reports have been taken into consideration by the local authorities, and the recommendations have also been dealt with by the Government of Bombay. Most of his proposals appear to have been accepted, and may now be carried out. The objections against certain of them have been mainly taken on the ground of expense, and on the ground that the practices to which he has taken exception are connected with popular habits, such for example as the noxious practice already referred to of keeping cattle within towns and compounds, a remedy for which in the case of Belgaum is stated by the President of the Municipal Commission to be "quite impossible." This reform has nevertheless been carried out elsewhere in India; and until the Belgaum municipality can see its way to removing cattle stables away from houses, there is one thing they can do, and that is to see that these places are kept scrupulously clean, and all manure and litter taken outside the town daily. One satisfactory matter in regard to this town is that there is no indisposition to deal with the abominable pit privies in houses, and to abolish them as soon as possible; at least such appears to be the intention of the European members.

30. It may not be uninteresting to introduce here a brief enumeration of work done by the Ahmednuggur Cantonment Committee since May 1874 (17 months). 500 trees planted; constructing three new bathing pavements for Native Infantry lines, and draining the pavements; introducing aqueduct water inside the Kothla, and draining the same; removing offensive brick-kiln; conservancy arrangements in houses by pans, and removing all temporary privies from compounds where required; stopping all cess-pits along public roads; causing windows to be placed in houses for ventilation; lowering the compound walls to secure better ventilation; providing bathing accommodation for different castes, and stopping bathing near reservoirs of drinking water; construction of masonry drains to bathing pavements; dry-earth pans placed in all public and private latrines; daily removal of distillery water; cows, buffaloes, and other animals removed from private dwellings in the bazaar, and open ground appointed for them to be picketed on (the very reform declared to be impossible at Belgaum); improving Mahomedan burial ground; latrines for commissariat followers and liquor shops; dust bins for the sudder and other bazaars; many improvements carried out, and complaints stopped.

Mr. Hewlett reports on the whole favourably as to the state of this cantonment, but suggests several important improvements, which were taken into consideration by the Committee, and no doubt will be attended to so far as their funds admit.

These facts will show the manner of working.

31. At the end of Vol. I. of the Report there is a very clear and interesting summary of it in the form of a Resolution of the Government of Bombay, in which there occurs a passage of considerable importance to the future progress of sanitary work in the Presidency.

Referring to Mr. Hewlett's Report on village cleansing (paragraph 110), in which he says that in this matter systematic attempts should be made to teach the people to help themselves, and that as a preliminary stage "the patel should have authority given him by law to compel the people to clean "the village," the Resolution says: "The Governor in Council desires that all Collectors will cause "careful inquiries to be made in their districts with a view to ascertaining what patels can be invested "with these powers, and hopes that the experiment may be given a full trial at an early date. There "is no class of men so qualified in the whole country as the village patels to advance sanitary reform "if happily they be favourably disposed on its behalf. It should be the object of every Collector to "persuade and convince them of its importance."

This passage is a fitting sequence to the employment of vaccination officers in general sanitary service, and if the experiment succeeds the two classes working in concert may do immense good to village populations in helping to remove the localising and aggravating causes of epidemic diseases.

32. In summing up these remarks of the Bombay Report of 1876, the chief recommendation which appears to be called for is that the authorities should adopt and follow up Mr. Hewlett's proposals for improving cantonments, stations, and towns, and that in regard to two classes of works, namely, subsoil drainage and house drainage, it would be most advisable to select a case for the application of each improvement, and wait the results to health and comfort; that as regards water supply, the works of this class carried out by Mr. Crawford and Major Ducat appear to show that in many of the smaller Indian towns pure water sources, capable of being utilized by pipes and hydrants in the towns, would neither be difficult nor costly of execution.

33. As regards the Army, the amount of drunkenness is so great that some more energetic and effectual method of dealing with this vice, and also with venereal disease, is proved to be necessary by the mere facts cited, and that, in face of the facts, excuses cannot be received as any justification of the amount of disease and inefficiency produced by these vices.

34. The amount of malarial disease at stations shows anew the necessity of lowering the subsoil water level, and aerating the soil by drainage.

35. The history of every case of enteric fever and the local and personal conditions under which it has occurred should be carefully traced and recorded at the time.

36. Means should be taken to bring to the notice of officers engaged in the planning, construction, and drainage of buildings the principles long since laid down in our reports and suggestions on these subjects.

37. Wells should be improved in conformity with our Minute on water filtration printed in the India Office Sanitary Report for 1875, Vol. IX.

38. The questions raised by Mr. Hewlett regarding the sanitary state of Officers' quarters be taken into consideration, and remedy applied.

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Lastly. The Army Sanitary Commission begs to concur with the Governor in Council "in thanking "Mr. Hewlett for the most interesting and practical Report which has yet been submitted from the "Sanitary Department," and at the same time to express a hope that the local authorities will see to it that his recommendations are carried into effect to the utmost of their ability.

24th June 1878.

No. 4.

MEMORANDUM of the ARMY SANITARY COMMISSION on the REPORT of the SANITARY COMMISSIONER for BENGAL for 1876.

Dr. Coates' Report for 1876 is divided into the following six sections:—(1.) Vital statistics. (2.) History of chief diseases of the year. (3.) Meteorology. (4.) Food supply. (5.) Personal proceedings. (6.) Sanitary progress. And the volume is concluded by the mortuary and birth statements, together with the Resolution of Government on the Report.

The Report is made up of very important details, referring to the sanitary condition of the vast population under the superintendence of the Commissioner; but through the whole of them certain leading facts can be traced, and perhaps the best course for the Army Sanitary Commission to follow will be to bring these facts prominently forward, and to render what assistance they can afford of a practical kind in their discussion.

1. Beginning with the section on vital statistics, it is satisfactory to learn in the opening sentence of the Report that "the year under review is distinguished by a very sensible advance in the registration "in the whole province." The deaths registered in 1875 were 600,104 or 10·01 per 1,000 of the estimated population, and 983,400 deaths were registered in 1876. The rate in the latter year equalled 16·40 per 1,000, chiefly among the rural population. The lowest rural death-rate registered was 7·45 per 1,000 at Rungpore; the highest, 34·54 per 1,000, was at Darjeeling. The death-rates in urban circles lay between 14·76 per 1,000 in Mymensing, and 59·32 per 1,000 at Lohardugga. As yet few returns are trustworthy, and many are largely in error. The most consolatory fact in regard to the registration is, that every one in any way having influence over it appears to be doing his best to make it as efficient as possible, and the results must be left to time in India as elsewhere. The chief point appears to be to get the village populations to take more interest in their own domestic concerns, and amongst others in recording deaths and their causes. One important fact is mentioned, which is not unlikely to help the advance of registration, namely, that these records, such as they are, have been appealed to in courts of law. There is less difficulty in districts under municipal rule, which afford evidence that, before many years are over, the death registration will have become reliable for all sanitary purposes.

2. The following comparative statements of mortality per 1,000 will show the present condition of registration in selected town districts as compared with Calcutta itself, in which the death-rates are now considered to be correctly registered:—

	Calcutta.*	Town selected Circles.
All causes	30·18	32·98
Cholera	4·30	5·52
Small-pox	·16	·64
Fevers	10·15	15·87
Bowel complaints	4·38	4·02
Injury	·47	1·12
All other causes	10·73	5·77

The means are afforded of comparing these rates with the death-rates in certain villages in Tushbunder, in which registration has been in use, under the auspices of the Zemindar Roy Romoni Mohun Chowdry Bahadoor, for three years, and the results, as will be seen, approximate closely to those already given. They are as follows:—

	Ratio of Deaths per 1,000 of Population.
1874	31·2
1875	31·91
1876	32·36

Every encouragement should be given to similar inquiries by Native gentlemen, and it may be suggested that the death causes might be added to the table with advantage.

It is a fact worthy of notice that the lowest ascertained death-rate among a large population in Bengal is in Calcutta, formerly one of the most unhealthy cities in the world. It has been undergoing active sanitary improvement, although its death-rate, 30·18 per 1,000, shows how much yet requires to be affected in this direction.

3. The registration of births is by no means in so advanced a state, and is said to be retrograding.

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* In our Memorandum on the Calcutta Municipal Report for 1876 reasons are assigned for believing that this estimated death-rate is below the truth.

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4. *History of Chief Diseases.—Cholera.*—This pestilential disease prevailed as a great epidemic in Bengal in 1876, and caused 196,590 registered deaths, nearly 20 per cent. of the total registered mortality of the year, and it swept away 3·27 per 1,000 of the population.

The disease prevailed with more or less severity in the 666 circles of Bengal, with the exception of 19, in which it was entirely absent. This fact shows how universally the disease was diffused over the province; but nevertheless, the majority of villages escaped. There are 188,805 villages in Bengal and of these 27,242, or 14·4 per cent. were attacked, and 161,563, or 85·6 per cent., escaped.

This experience confirms anew the hitherto observed law of cholera diffusion, that it attacks and remains in special localities until its force is spent, and that cholera does not spread generally over the entire population during the same epidemic outbreak.

5. The following monthly abstract of deaths shows that the epidemic of 1876 had two well marked periods of maximum, and that there was some relation between these and the rainfall:—

	Deaths.	Rainfall.
		Inches.
January	7,431	·20
February	4,861	·18
March	14,998	1·83
April	80,642	1·62
May	22,790	5·20
June	17,620	11·87
July	14,233	14·91
August	6,700	14·50
September	2,470	10·22
October	3,785	4·79
November	24,556	·75
December	46,554	·96

Light rainfall, and its concomitant drying up of the ground and water sources, is followed by augmented mortality, while heavy rainfall, with its accompanying washing out and flushing effects and improved water-supply for domestic purposes, is followed by a decline of the disease; confirming the law deduced statistically by Dr. Bryden many years ago, and affording a clue to the more important sanitary measures required in Lower Bengal. The relation of rainfall to cholera is thus stated by the Sanitary Commissioner :—"As a general rule the disease prevails least when the rainfall is heaviest, and "has submerged or is moving on through the country, particularly in Bengal." In the low flat alluvial district of Backergunge cholera is endemic, and "first attacks those parts of the country which are "affected by the fall of the height of the water level after the cessation of the rains, and these are the "highest parts of the country near the banks of the large rivers. In its spread it follows the fall of "the country and the retreating waters."

This experience is virtually the same as that afforded in the case of other diseases besides cholera in India. It is not so much the amount of rain, or even the flooded state of the country, from which danger to health arises, as the sodden water-logged condition of subsoil after rain, in districts where the subsoil water, instead of escaping, remains stagnant and generates malaria.

The relation of this condition of subsoil to local outbreaks of cholera is prominently dwelt on in the numerous reports quoted by the Sanitary Commissioner supplied by local medical officers, and the opinion appears to be generally held that the more immediate and dangerous results following from it are those connected with the condition of the water-supply.

6. A few statements from different districts of the country will show the nature of the complaints under this head.

In Raneegunge town the cholera deaths were 5·72 per 1,000 of the population.

"The water in the tanks was at this season rapidly drying up, and the tanks received surface "drainage." "The water-supply and quarters of the European servants of the East Indian Railway "Company, who suffered most, were highly objectionable." They appear to have suffered from water obtained from a foul filter, a not uncommon disease cause.

In Bankoora, the cholera death-rate was 7·74 per 1,000 of the population, and it extended over the district. "This outbreak was ascribed to the scanty and impure water, as, when it made its appear-"ance, almost all the tanks were dry and the water in the few that contained it was foul and filthy."

Baraset Sub-division.—"In Habra, which suffered the most, good drinking water is hardly obtainable, "and the supply of whatever kind it be is scanty." "The outbreak which occurred in Monirampore "was ascribed to bad water."

The disease was very virulent in Tollygunge, Balligunge, Baniakpuker, Watgunge, and Ekbalpore. As is the habit with many Natives, they bathe, wash their clothes, and urinate in the tanks, defæcate on the margins, and use the water afterwards for cooking and drinking purposes. In Nuddea the first epidemic outbreak of the year was accompanied by chilly nights, and rapidly evaporating drinking water. A list of 12 thanas is given in which the cholera death-rates were from 4·07 to 10·46 per 1,000, and the following account is given of the localities: water supply invariably bad, insufficient and unprotected from surface pollutions, want of rain curtailing the water-supply, and the little water there was rendered very concentrated and unwholesome; "as soon as the rain fell abundantly cholera "diminished."

The awful outbreak of cholera which followed the cyclone in South-eastern Bengal; appears to have been partly due to water impurity. Of a group of attacked villages in Rajshahye it is stated that they were found in a disgraceful state of filth; "no drainage, no conservancy, no drinking water "arrangements, and the only water obtainable tainted with decomposing vegetable and animal "matter." Another report states that bad water was the chief cause of cholera after the cyclone. "The entire country over which the wave passed was deprived of fresh water. Scarcely a tank or "well escaped contamination, and streams and fresh water springs are rare." The total deaths in the

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two months after the cyclone wave had passed over the district were 2,101 in November, and 5,261 in December. In parts of Nattore town the privies are run up over-hanging patches of water which is used for drinking and bathing purposes.

7. Similar statements regarding water-supply might be repeated from all parts of the country, but instead of adding to their number it may be more useful to cite cases where the water-supply was good, and the result of this on the cholera mortality.

In a certain district in Chittagong, inhabited by Mughs, there was no cholera. The people appear to be regardless of all sanitary precautions except two,—1st, their houses are raised on piles; and 2nd, "a Mugh will walk five miles to get a ghurra of pure spring water for drinking purposes."

One medical officer gives an account of supposed importation of cholera into tea gardens by coolies, but no dates of any use are given in support of this view. It appears to be an assumed explanation of the facts. From other sources we know to what an extent the filthy habits of these coolies influence their liability to severe outbreaks of cholera, and referring to these outbreaks, we are told that "the "immunity of the Europeans living in the midst of this epidemic was remarkable, although they "attended the sick and buried the dead," and this is ascribed to good accommodation, suitable food, good drinking water, and clothing, and attention to the general laws of sanitation.

During the festival at Pooree, which was attended by some 25,000 pilgrims, there were 274 deaths from cholera, but it is added as remarkable that the Europeans living in Pooree are always exempt from cholera, although they are surrounded by the disease to a great extent. The same holds good in Balasore, and also in Cuttack. "The cause is plain here as elsewhere, viz., they live comfortably, and "drink pure water."

Another noteworthy fact of the same kind may be given. It is as follows:—"The great fair at "Caragola has ceased to originate and spread cholera, since latrine arrangements have been made, "and the river bank has been kept free from fæcal contamination, thus preserving the drinking water "from pollution."

An outbreak of cholera took place in the jail at Durbhunga which "was proved as far as it could be "proved to have been due to impure water, for as soon as a tank which had foul water in it was "guarded from use, and boiled water substituted, both the cholera and diarrhœa that were prevailing "ceased as if by magic."

8. These facts taken from the reports show how prominently the influence of impure water in aggravating the severity of cholera impressed itself on the minds of medical officers during the epidemic of 1876. But this is not the only assigned cause. The sanitary problem in these Bengal villages must be considered as a whole.

They present the usual concomitants of cholera, such as filth in streets, houses, and open spaces, water pits and hollows in and around villages, low position, want of drainage, poor living, and bad house accommodation, and, in the case of pilgrims, fatigue, inferior diet, crowding, occupying in successive groups the same areas of foul ground, together with bad water.

Perhaps, as suggested by the facts, the easiest and least expensive remedies would be those for preserving tank water from pollution, at least to begin with, but in order that measures for this end may be carried out, one or more tanks would have to be selected in each locality to be set apart solely for drinking purposes. The tanks would have to be cleared out, the margins cleansed, places for drawing water set apart, and the whole surrounding ground strictly guarded from pollution. There is nothing in this which apparently might not be done by the people themselves under suitable advice. Where there are municipal authorities they ought to provide for the conservation of all water sources as part of their current duty.

9. *Small-pox.*—There were 10,746 small-pox deaths in Bengal in 1876. Out of 666 registering circles, 30 only were severely attacked, and 206 circles escaped altogether.

The monthly prevalence of the disease was as follows:—

	Number of Deaths.
January	437
February	982
March	1,652
April	2,095
May	1,672
June	1,116
July	824
August	407
September	467
October	229
November	292
December	573

The highest registered death-rate was 7·78 per 1,000 of the population of Barh Town.

A list of the more severely affected districts is given, in 22 of which the Act prohibiting inoculation is not in operation, and as a contrasted fact it is stated that the immunity of Bogra, where there were only two deaths, was due to the self-denying efforts of Surgeon-Major Lidderdale, who carried out efficient vaccination while he himself suffered from fever attacks.

It is satisfactory to be informed that on the whole vaccination is gradually gaining ground, although in several districts it is much disliked and opposed, and inoculation preferred. The obvious lesson taught by the facts is that inoculation should be put a stop to, and vaccination pressed forwards throughout the province.

10. *Fevers.*—Every district of Bengal suffered from diseases classed as "fevers," but these diseases manifested their severest character in Bengal proper only. There were altogether 561,530 deaths registered under this head in 1876, nearly two-fifths more than in the preceding year, but the Sanitary Commissioner considers that the increase is due to better registration. In the selected registration circles the fever death-rate was 15·87 per 1,000 of the population for urban, and 11·95 per 1,000 for

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rural circles; and in both groups of circles the deaths ascribed to fever amounted to 56·55 per cent. of the total mortality.

11. The seasonal prevalence, and mortality of fever, were as follows:—

	Fever Deaths.	Rainfall.
		Inches.
January	39,135	·20
February	35,400	·18
March	39,577	1·33
April	42,396	1·62
May	36,937	5·20
June	35,095	11·87
July	41,574	14·91
August	46,584	14·50
September	50,985	10·22
October	61,784	4·79
November	65,980	·75
December	66,088	·96

This table shows the fever mortality to be greatest in the drying up months, October, November, and December.

The localities most severely affected are stated to be "districts and portions of districts where a "damp soil, jungle, and decaying vegetation abound."

There is nothing new in this statement, but it confirms, from the observations of experienced Officers, the existence of such causes in specific localities where they may be dealt with more or less effectually.

12. The following contrasts between the local favouring conditions of fever and cholera are recorded by the Sanitary Commissioner:—

(*a.*) Cholera and fever both prevail most severely and fatally during the drying periods of the year. (This law, as regards cholera, is more applicable to Bengal.)

(*b.*) "The more rain the more fever" does not apply to cholera; but "the less rain the more cholera" does hold good for fevers.

(*c.*) "Fevers occur during heavy and prolonged rains, while cholera then ceases." (As regards fever not so much as during drying up of the rains.)

(*d.*) Fevers cling to damp soils and decaying vegetation, avoiding and passing over porous and dry soils. Cholera has no such relationship. (It must here be remarked, however, that if this observation holds good as regards cholera in Bengal, it appears not to be universally applicable in India. It suggests matter for further inquiry.)

(*e.*) Fever is worst and most constant in dense jungles and uncultivated wastes, and along drying up river beds, while cholera has no such specialities.

(*f.*) Good drainage and efficient agriculture stop and prevent fever, but not cholera. (The contrast as regards cholera, requires confirmation.)

(*g.*) (The following contrast, however, is an important one for practical purposes.) "Cholera is worst "and most constant in unsanitated and crowded fairs, and pilgrim routes, no matter at what "season or place they occur; whereas fever does not attend those places as a rule."

(*h.*) Agues cease at 6,000 or more feet above the sea level; not so cholera (although less destructive at great elevations).

(*i.*) Santhals and Mughs suffer much from fever, and little from cholera. Both are specially careful about their drinking water.

(*k.*) Although certain analogies may be traced between the phenomena of ague and cholera, nevertheless the organs which suffer in the one disease are not those which suffer in the other.

Comparisons of this kind between the conditions under which epidemic diseases prevail are only useful for practical purposes if they include all the cases. But on turning to the next page of the Report, the following account of the local favouring conditions of fever in two localties is given. *Bankoora.*—A very severe outbreak of fever. Almost every house suffered. Sanitary arrangements utterly bad, jungle excessive, stagnant pools of water, with decaying vegetable matter; dampness; people and houses filthy in the extreme; as many cesspools as there are houses. *Beerbhoom.*—During one fever outbreak there were 4,884 attacks, and 1,238 deaths. Cause stated to be in a great measure due to wretchedly filthy condition of every village. Stagnant putrid water, rank rotten vegetation, manure heaps, and holes filled with all kinds of filth.

It is obvious that it would be a doubtful proceeding, so far as concerns the prevention of fever, to remove the surface vegetation and subsoil water and to leave the filth.

In the same way, if cholera presented itself under similar conditions, it is doubtful if the best way of preventing its recurrence would be to remove the filth and leave all the other disease causes in full operation. Both should be removed.

But there is another aspect of the question suggested by the facts about Beerbhoom.

It appears that in this locality there were 4,884 fever cases, of which 1,238, or one in four, proved fatal. Now it may be safely stated that no such death-rate arises from ague, and that, in all probability, the fatal cases were of fever having another ætiology. Although the true nature of many of the low forms of fever is still unsettled, and, possibly, too absolute a distinction may be drawn between so-called enteric and "typhoid malarial fever," for which latter it may not always be necessary to seek a "filth cause," still it may be again suggested as a subject of inquiry whether certain of those indigenous Indian fevers among the Native population may not be enteric in character. And, if this be so, the filth element may turn out to be as important a death cause during fever epidemics as malaria. The Beerbhoom case, it is necessary to state, is by no means a solitary one. Similar facts have been observed all over India, and these disproportionate death-rates have, in times past, raised doubts in the minds of medical observers in India whether some other cause besides malaria was not engaged in their production.

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In the present Report, the Civil Surgeon of Dinagepore describes the year's fevers as "nearly all "bilious remittent fever, running rapidly into low nervous continued fever, which was very "fatal." "There were a few cases of typhoid, and one well-marked case of typhus which terminated fatally." The question is a large one, and is connected with the pathology of Indian fevers generally, an almost unoccupied field of investigation. But the present and preceding Reports clearly point to one and the same practical conclusion, that the fatal forms of native fevers are the result of local filth in air, earth, and water, as well as of local malaria, and that, in endeavouring to mitigate the ravages of these fevers, it will answer little good purpose to remove one class of causes and to leave the other, and hence that for practical sanitary work it is unnecessary to separate between the local favouring conditions of fatal fevers and endemic cholera. If every village is cleansed and kept clean, cattle removed to the outskirts, filthy water-holes filled up, good surface drainage and good water provided where required, and culinary water-sources protected from pollution, all simple enough remedies, and mostly within the working power of the villagers themselves, we have every reason, from past experience, to predict that there will be less to record of the ravages of either fever or cholera. Improved drainage and agriculture in the districts themselves, and rectification of watercourses and rivers, will then, in time, reduce more effectually the general malaria of the country.

13. No doubt there are many cases in which the people of these poor villages are unable to help themselves effectually. Take, for example, the following facts regarding two villages in Thana Damurhuda, in which about a third of the population suffered from fever, while the neighbouring villages were free; fever stated "to be due to density of brushwood jungle; air close, stifling, and "charged with decaying vegetable matter; to the existence of an immense number of large ditches "and hollows filled with putrid water, and to want of drainage, the place lying water-logged and the "organic portions of the soil itself being almost putrid." All these evils have been increasing year by year. Surely some one ought to be held responsible for such a state of matters, or the villages should be removed to a more healthy site. It may be suggested whether those who have a beneficiary interest in these villages should not be called on in their own interest, as well as in the interest of the State, to keep their properties in a wholesome condition. A single badly kept village may risk the health of a considerable district.

14. *Bowel Complaints.*—In 1876 as many as 58,701 deaths were registered from bowel complaints. The monthly deaths were as follows :—

	Deaths.
January	3,785
February	3,605
March	4,117
April	4,903
May	4,562
June	4,582
July	5,656
August	5,902
September	5,456
October	5,282
November	5,372
December	5,474

The Sanitary Commissioner states that this distribution of the mortality proves again "that the "evening and morning damp and chills, and sudden alternations of temperature of July, August, and "September, and the extreme cold night air and heavy dews of October, November, and December, "acting on the poor, ill, and insufficiently clad, badly fed population, who sleep on damp floors, and "of whom a large proportion are, moreover, debilitated and broken down in constitution, subject "them in very large numbers to the influence and fatality of bowel complaints."

Here we have another set of conditions enumerated, which amount to this, that the housing, clothing, and feeding of the people are so inferior as not to protect them from ordinary daily climatic changes, and that they sleep on cold damp undrained ground. Part of the result may nevertheless be due to malaria.

This Commission has long called attention to these disease causes, more peculiarly connected with the civilization of the people, and they are again reproduced in the present Report in their deadly effects on the public health, for it is not to be supposed that their influence is solely confined to the production of diarrhœa and dysentery. Their tendency is directly to undermine the stamina of the whole population exposed to them, and to make them liable to attacks of any epidemic that may be about. All the Commission can do in the matter is to call attention again to the facts.

15. In the midst of so much which it appears to be difficult to remedy, there is some satisfaction in quoting the following statement regarding the European population in Bengal, both for its facts and the lessons it conveys.

"It is worthy of note how rapidly and decidedly dysentery, and indeed all chylopoietic disorders "have ceased to attack Europeans in this country. The old reckless exposure to sun and rain, the "heavy tiffins, midnight suppers, and stronger liquor drinking have ceased; in proportion, agues are "getting rarer among them every day. They are better protected, our women are less pale, thin, "and lethargic, more muscular and firmer, more energetic, healthier and happier, since croquet, "badminton, and lawn-tennis have given them some real out-door exercise" (not living in dark rooms), "and in going through Bengal I find this healthy state to be in proportion to the prevalence of these "games, and where they do not exist, the old pallor and appearance of suffering and exhaustion are "more or less present. Altogether, and even as it is, Europeans are freer from disease, longer lived, "and healthier than the great majority of the Natives themselves. Old Indians do not now retire broken "down to die within the year. * * In his stead we have the veteran of 40 years' service strong "and vigourous to work and to enjoy life another quarter of a century. The degeneration of the careful "Englishman in India has become the exception, and not the rule as it was in former days."

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This striking experience ought to afford a lesson to every European going on Indian service. It must now be recognised that home habits will not preserve health in India. The climate puts in claims that must be met, and Dr. Coates has told us what the visible results are, even now, of complying with them. But year after year the Commission has called attention to the fact that the very diseases, diarrhœa and dysentery as well as liver diseases, which have so strikingly declined among Europeans generally still exist apparently unchecked in a special class of Europeans, namely, the private soldiers.

It is further known that intemperance and its results are co-extensive in the Indian Army with these fatal diseases. The facts speak for themselves, and ought to produce their proper impression on all Officers having the care and conduct of troops in India. It ought no longer to be possible to say that delicately nurtured English ladies can so manage themselves in India as to escape those climate diseases under which so many strong young men, year by year, succumb, even when in charge of educated officers and skilled medical attendants. If the problem is only taken in hand, there is not the slightest doubt that it can be solved.

16. *Injury.*—Under this head are recorded 40,151 deaths from accident in 1876, as compared with 6,689 in the preceding year. The great increase of mortality in 1876 was due to the cyclone, in which above 34,000 people appear to have perished. The usual tidal wave had flooded the low lands, and before it could recede the storm wave swept over the country and covered the coasts of Backergunge, Noakholly, and Chittagong to a depth, in the more exposed parts, of from 40 to 45 feet. In some places every living thing appears to have perished. Another prominent death cause under the same head was from snake-bite and wild beasts, the registered deaths from which were 10,062. The Commissioner states that the mortality from snake-bite is largely due to persons going out at night for natural purposes, especially during the breeding season of serpents. Until some organized system of destroying snakes and wild animals is established the preventable mortality from this cause must continue.

17. Before leaving this part of the Report it may be useful to introduce the following facts about cattle plague :—The cattle herd in large numbers, and are collected night after night in one spot, till "the whole ground is polluted with cow dung and the air rendered offensive. This may not be the "exciting cause of the infection, yet it is a very general accompaniment, and probably is the chief "predisposing cause;" and it may be added that it must be met by some other measure for its removal besides killing affected cattle.

18. *Personal Proceedings.*—Under this section of the Report an account is given of the result of sanitary inspections carried out in the following places, the first three by Dr. Pilcher, and the remainder by Dr. Coates:—

Cuttack.	Jessore.	English Bazaar.
Pooree.	Dinagepore.	Burdwan.
Balasore.	Noakholly.	Purneah.
Soory.	Purulia.	Darjeeling.
Nya Doomka.	Buxar.	Backergunge (Burrisal).
Furreedpore.	Malda.	Chittagong.
Goalundo.		

Most of the localities inspected are on the Delta of the Ganges and Brahmapootra, on low lying alluvial land intersected by rivers and watercourses, some of which are all but dried up in the dry season to form successions of shallow pools containing impure water, often the only water the people have to drink. In many districts there is no drainage, and in others the country is intersected with drainage ditches which have been left to fall into disrepair, to the great detriment of the health of adjacent villages, many of which have to be deserted during unhealthy seasons. Many districts are covered with dense jungle, and during most of the year the ground is wet or moist and the air loaded with unwholesome damp. To these great natural disadvantages of site the people themselves have added other unwholesome conditions, which act immediately on their own health.

In similar localities in Burma the inhabitants escape to a great extent the evil influence of ground damp and malaria by raising their houses on posts to a height of six or eight feet above the ground. But in Lower Bengal the Native huts are built directly on the wet or damp soil; the walls are often damp up to the roof. In one instance at Burrisal it is stated that "green vegetation extends to the roof of some of the wards of the jail." The people sleep on the ground, which is often visibly damp. They appear to have no conception of any importance being due to the fundamental fact of all sanitary work, viz., that dead matter excreted from the human body, whether from the lungs, skin, intestinal or glandular organs, cannot be re-introduced into the system without immediate danger to health and life. Hence every village is honeycombed with cesspits or foul water holes. There is scarcely a well that does not abound with putrescing animal matters, and where water is drawn for use from rivers or tanks the same place is used for bathing, washing, and performing the functions of nature. It may be safely predicated that scarcely any water is used by village populations, and in not a few towns, which is fit for drinking or cooking.

Besides this dangerous and preventable foulness of the domestic water, the air and earth are polluted by the filthy habits of the people, and their clothing, and in not a few instances their food, are so scanty as to lower their general health and disease resisting power.

19. These facts are all so familiar that it would scarcely be necessary to recapitulate them, were it not that they form the subject matter of many painful details in these inspection reports; and they quite account for the observed predisposition to the ravages of fever and cholera which from time to time decimate the village populations of Lower Bengal.

At first sight the problem which these villages present appears to be all but insoluble. We have already seen that within the Bengal Government there are 188,805 of them, the great majority of which are in all probability exposed to the combinations of insanitary conditions already specified.

It is obvious that the main evils can only be grappled with in detail, village by village, and by the people themselves. But at the same time there must be some responsibility resting on the proprietors

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in regard to larger works, such as providing and cleansing water tanks, cleaning out watercourses and ditches, and filling up foul water holes.

This inspection work of the Sanitary Commissioner on the part of the Government is of the greatest importance, and is ably done and recorded. So far Government has been doing its part, but everything depends on what comes of it. It may, from this point of view, be possible, after further inquiry by local officers, to arrive at some clear course of proceeding, so that now the evils are known, steps may be at once taken to determine who is to remedy those defects which are beyond the power of the people themselves to deal with.

20. The most prominent and most important disease cause coming under this category is, beyond a doubt, the foul condition of the village watercourses.

This central fact comes out prominently in all the local reports. If there be one sanitary work of more immediate importance than another it is that every village shall be provided with water fit to drink, either from tanks, wells, or rivers, and that somebody should be held responsible for doing this work. It may be suggested whether necessities such as these regarding the water-supply of villages might not be dealt with on some such principle as the one adopted by the Government of Bengal in dealing with the Calcutta bustees,—to execute the works, and charge the cost to the proprietors, in the event of their not being carried out by the village proprietors after due notice.

The conservation of water-sources and of village drains might in this case be provided for by the people, and it is at this point that instructions similar to those which have been issued for the use of villages by the Sanitary Commissioner, and quoted in the present Report, should come into use, but unfortunately we are informed in the reports that these instructions have been of no benefit. The Commissioner must know best the degree of intelligence of the people with whom he has to deal, and the prejudices to be overcome, but the instructions appear somewhat long, reasoned, and detailed, and it has occurred to us to suggest whether a few short pointed directions regarding cleanliness of houses and villages, removing of cattle outside, and avoiding every practice which could endanger the purity of drinking water, would not be better; a brief code, in fact, of village sanitary rules, which all could understand, and which the village authority, where there is one, could in some way enforce.

21. The time appears to have arrived for taking positive action on the knowledge already obtained.

Of course, all that relates to rivers, watercourses, and the general drainage improvements, must necessarily be left to the Public Works Department. What we have said is simply a suggestion on defective local knowledge. But one thing appears to be certain, that the causes which have made these river deltas the nursery grounds of epidemics of cholera are known, at least such of them as are amenable to engineering and sanitary procedure, and that they ought in some way or other to be dealt with.

All that can be done here is to suggest general principles of procedure the details of which must be left to Government.

22. The chief difficulties in municipal towns appear to be those connected with water-supply and conservancy, and the excuse put forward by the authorities in two or three cases is want of funds, which simply means that they cannot afford to keep water tanks clean and to adopt cleanly habits themselves. If every one did his part in these matters no outlay would be required. But, even as it is, the Sanitary Commissioner has shown that by the application of town manure to agricultural ground, land rented at Rs. 5 per beegha can be let for from Rs. 12 to Rs. 27 per beegha. In many cases it appears that people will not use public latrines, and prefer resorting to the fields. In such instances the practice of Bijnoor might be adopted, which is to appoint a mehter to cover at once all deposits with earth, and by cultivating areas of ground dealt with in this way, the whole cost of the proceeding would be more than covered.

The facts as a whole appear to lead to the conclusion that an important part of future work of Sanitary Commissioners will be to instruct both municipal authorities and people in the simplest and least costly details of sanitary work, especially in the conservation and regulation of sources of water-supply, methods of dealing safely with town manure, filling up holes, levelling and draining surfaces, and roads. In this way it may be possible to lay a foundation for future proceedings.

23. *Sanitary Progress.*—This, which forms the subject of the last section of the Report, deals rather with improvements which are necessary than with completed sanitary works. It gives the substance of returns from 39 districts, comprehending 138 municipalities, with a population of 2,415,702, and showing an expenditure for sanitary works of about 41,000*l.* for the year. It is stated that in all the municipalities and towns, and in some districts, surface cleansing, repairs of latrines, drains, roads, &c., deepening or cleaning of tanks, wells, &c., have been carried out more or less.

The provisions of the Bengal Municipal Act, V. (B. C.) of 1876, have been extended to a number of localities enabling byelaws for sanitary purposes to be framed. Act VI. of 1870 was also extended for improving the registration. The Act for forbidding inoculation was likewise applied to a number of places.

Much has been done by Dr. Pilcher for improving the sanitary condition of the port of Calcutta, and a purer water-supply has been provided for shipping.

Additional conservancy arrangements are being introduced at Pooree, the great place of pilgrimage, and steps had been taken for protecting and improving the water-supply and resting places along the great pilgrim routes.

There is little else to report in the way of sanitary works, but much to state in the way of difficulties. It is not satisfactory to be informed that the main reason for executing works is to be sought for, not in a desire for progressive improvement in the public health, but merely as an occasional compulsory result of catastrophes. "The general body of the people" we are told "will not, as a rule, "help themselves. They do not believe in the value of pure air and water, cleanliness of habitation, "drainage, good conservancy, &c. They are content to abide by the habits of their ancestors, and if "they suffer and die, they attribute the contingency to fate, and not to the neglect of sanitation. "The people are, moreover, in most cases really unable to incur the required expenses."

24. Perhaps, of all historic peoples, many of those inhabiting Hindostan have made the smallest advances in sanitary knowledge, and in this condition have become an inheritance of the Government

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of India. To suppose for a moment that they cannot be raised out of the pestilence breeding habits which have descended to them through ages, would be to suppose that they differed essentially from all other races in this matter. Even in Dr. Coates' Report, which is not a very hopeful one, there are lights which might be followed. Such, for instance, are the proceedings of local magistrates, the enlisting of persons of local influence in the work, division of districts, and the like. And why should not there be added to these agencies the direct action of local property owners? There is likewise another agency suggested by Dr. Coates, which might be useful even in the present generation. He says: "Were the educational department to make the teaching of the laws of health in a simple "elementary form incumbent on all patshalas or vernacular aided schools, it would be easy to make "the rising generation carry out sanitary reforms when they come to control their own social affairs."

It may be asked, why should not every student leaving any college throughout India carry with him a sufficient knowledge of sanitary requirements to enable him to estimate their importance to the health and civilization of his countrymen, and so to aid by his example and influence improvements among the existing generation?

To sum up:—

(1.) There is evidence that increasing interest is being taken in the matter of registration, and that the record of deaths is improving.

(2.) The visible removable causes of epidemic outbreaks in Lower Bengal are sufficiently known for all practical purposes. Those of them which are connected with the drainages of the country, river conservancy, and the like, must necessarily be seen to by Government agency.

(3.) Of those which are more particularly connected with popular interests and habits, the most immediately important is the condition of the water-supply, which, as shown by the present Report, is such, in many districts at least, as to be a species of epidemic poison, a result due partly to the nature of the water source, but mainly to foul Native habits, which would soon render the purest water source unfit for use. It is hence obvious that not only must water sources be cleansed and improved, but steps must be taken to prevent the people themselves from polluting them.

(4.) That the known principles of village sanitation required to be enforced on the people by simple village rules, by the influence of headmen, local proprietors, and other persons of influence, magistrates, &c., under visitation by Civil Surgeons and the Sanitary Commissioner; and if the vaccination service is so organized as to admit of its agency being used for general sanitary work as in Bombay Presidency, it might be advantageous to make use of it in this work.

(5.) Considering the past sanitary history of Bengal, the Commission would suggest that the proposal of Dr. Coates to introduce simple sanitary teaching into schools, and also into colleges, might be taken into consideration by Government.

Lastly. The Commission regrets that the record of sanitary progress even among the comparatively limited population to which it refers cannot be considered as altogether satisfactory, although they are desirous at the same time of stating their satisfaction with the zeal and ability with which the Sanitary Commissioner has fulfilled his laborious duties. It is evident that, had the results depended solely on his work, they would have been of a different character.

23rd February 1878.

No. 5.

MEMORANDUM of the ARMY SANITARY COMMISSION on the REPORT of the SANITARY COMMISSIONER for the PUNJAB for 1876.

In consequence of his resignation of the office of Sanitary Commissioner of the Punjab by Dr. De Renzy on his promotion, the duties were taken over by Surgeon-Major Bellew, who has prepared the Report for 1876. There is prefixed to the Report a Minute of proceedings on it by the Lieutenant Governor; and as this paper is in itself an important contribution to the sanitary history of the year, it is proposed to include its contents in the following remarks on Surgeon-Major Bellew's Report.

1. The estimated population of the Punjab for 1876 is not given, but the census population of 1868 was 17,487,125. There were 496,884 deaths registered in 1876 = a death-rate on the census population of 28 per 1,000, showing an increase of 2 per 1,000 over 1875. This is the largest death-rate yet registered in the Punjab, but it appears doubtful whether it really indicates an increase of mortality to this extent, because of recent years compulsory registration powers have been accepted by an increasing number of municipalities. At the end of 1876 there were 173 municipalities exercising these powers, 25 of which had adopted them during the year. The facts as they stand, unfortunately, leave no doubt that the death-rates in the Punjab are very high, especially in the larger towns, which have yielded the following mortality during the year:—

	Death-rates per 1,000.		Death-rates per 1,000.
Rewaree	32	Batala	51
Delhi	42	Umritsur	71
Bhowani	22	Lahore	54
Kurnool	58	Mooltan	37
Panipat	29	Gujeranwala	52
Umballa	45	Sealkot	49
Loodiana	45	Rawulpindee	44
Ferozepore	86	Peshawur	35
Jullundur	138	Dera Ismail Khan	25
Hoshiarpur	76	Dera Ghazi Khan	45

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Out of 208 municipalities there were 100 in which the mortality in 1876 was 40 per 1,000 and upwards. In some of the smaller towns the death-rates were 10, 12, and 14 per cent. It is clear from these facts that the local incidence of mortality is already known in this Government, or that it could be easily ascertained, and there ought to be no difficulty in arriving at its causes, of which too little is said in the Report. More ought certainly to be looked for than a simple reproduction year after year of a list of high death-rates.

It may be suggested whether these 20 deadly municipal towns ought not to be at once submitted to survey and inspection, and the death causes and engineering remedies pointed out. It must be obvious that the only use of statistical data of this class is to lead directly to remedial measures.

2. As a step in this direction, the Government proceedings give the following instructive table of death causes for the last 10 years :—

Years.	Cholera.	Small-pox.	Fevers.	Bowel Complaints.	All other causes.	Total Deaths.
1867	43,146	20,483	173,681	Not recorded	75,398	312,708
1868	532	24,222	151,337	17,823	73,871	267,785
1869	9,258	53,169	272,946	30,953	87,495	453,821
1870	469	27,163	275,093	27,249	88,952	418,926
1871	369	25,534	213,548	21,678	102,249	363,378
1872	8,727	23,728	264,711	23,345	110,097	430,608
1873	148	25,699	219,909	19,640	91,757	357,153
1874	78	12,026	190,681	16,407	97,571	316,713
1875	6,246	13,594	279,841	27,550	119,997	447,208
1876	5,736	10,254	351,286	27,271	102,297	496,844

Making every allowance for defects in the death registration, this table shows historically, as well as in the present fact, that the key to improved health in the Punjab is to be found in measures for diminishing the amount of fever, and the Commission concurs entirely in the view of the Lieutenant Governor in impressing upon the Sanitary Commissioner "the importance of continuing his strenuous " exertions to reduce, or to point out the means of reducing, the death-rate from fever which in its " various enteric, malarious, and intermittent forms is the great scourge of the Punjab."

3. But on this the most important sanitary problem in the province there is no information in the Report except that the unusual prevalence of fever was "attributed to an excessive dampness of the air "and soil in the several localities affected, as the results of either floods or naturally swampy land. " These conditions," the Acting Sanitary Commissioner states, "no doubt exercise a very widespread " influence in the production of malarious fevers, but this year there seems to have been some ill " understood change in the atmospheric and climatic influences which combined to produce what is " termed malaria, and as a consequence the prevalence and mortality from the disease (fevers " especially) caused by exposure to its action have been increased to a frightful extent." If the matter in hand were simply to draw up a rapid sketch of the disease, this statement might pass without remark. But we beg to point out that the duty of all sanitary authorities is prevention.

Whatever effect may be due to purely climatic causes, it is quite certain that we cannot directly act on them, but it is equally certain that climatic causes never generate malaria. There are other factors, altogether connected with earth and water, the action of which is more or less under control, and it is at this boundary line that the sanitary proceedings commence. In the words of the Royal Commission on the Sanitary State of the Indian Army, malaria "is the product of heat, moisture, and vegetable " decomposition. The production of malaria can be checked by withdrawing any one of the elements " on the co-existence of which it depends." The Acting Commissioner's view is that "the people " must be taught to feed, clothe, and house themselves in a manner suited to the circumstances of " their lives; . . . the importance of attention to these hygienic precautions cannot be too " earnestly impressed on the people, and it should be one of the chief duties of Municipal Committees, " as the representatives of the people, to advise and guide them in these matters," and if this were done "much of the fever mortality which is year by year recorded in this province would cease to " occur." If this were all, then the case would be well nigh hopeless, for, as the Lieutenant Governor points out, "these are matters in which the Government can do little, and local Committees little more " than the Government." And then comes the following statement, which is of more importance to the elucidation of the causes of these fevers and their remedies than any amount of discussion about climates. The Lieutenant Governor says :—"The question whether these malarious fevers are " increased by canal irrigation is one of considerable importance. The Lieutenant Governor is, how- " ever, of opinion that irrigation, if accompanied by proper drainage of the soil, does not produce " what is called malaria, but that, where the drainage is insufficient, the soil may become saturated " with moisture, and produce that unhealthy condition of the climate which is attributed to canal " irrigation, but which should more properly be set down to want of drainage. The highest mortality " was in the Jullundur district, where there is no canal irrigation whatever, but where, owing to " certain peculiarities in the physical formation of the country, aided probably by the embankments of " the Grand Trunk Road and railway crossing the natural drainage line at right angles, the successive " heavy rains of two or three unusual seasons caused the country to become waterlogged. The water " lines in the wells rose several feet, and the whole country became in the most insanitary condition " that could well be conceived. The same results from want of drainage are seen in the case of canal " irrigation in many villages of the Western Jumna Canal, which have been decimated by the same " description of fever."

There can be no doubt of the truth of the principles embodied in this statement, and without at all undervaluing the influence of defective diet and insufficient clothing in bringing about recurrent attacks of these fevers, the Commission concurs entirely in the view as to practical remedies put forward by the Lieutenant Governor. The duty of the sanitary adviser is to investigate the local

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conditions under which these fevers arise, and in reporting them to the Government to advise on the steps required for remedying any defects he may have discovered.

4. The great importance of this work is shown by the fact that fever mortality was reported in 1876 in every registration circumscription, of which there are 240 in the Punjab, and the intensity of the disease may readily be estimated by the following classification of fever death-rates by registration circles :—

Number of Registration Circles, Towns, &c.	Death-rates per 1,000.
34	Under 10
106	10 to 20
46	20 „ 30
27	30 „ 40
15	40 „ 50
5	50 „ 80
5	80 „ 100
2	100 „ 120

This brief summary shows at a glance the bearing of local conditions on fever mortality, and it proves that general climatic and personal causes cannot account for the facts. It also confirms the Lieutenant Governor's view of the causes. The most common cause of Indian fevers appears to be stagnant subsoil water, which appears to act in regard to malarial diseases in a similar way to the action of stagnant air in other diseases. The remedy for both is movement, which in the case of water implies means for draining the subsoil, and consequent lowering of the water level. The most deadly malaria is merely of a local character, a fact long known, but which is again adduced in the preceding table. It may be traced to its source, where the subsoil under villages and houses is waterlogged, where the well-water level rises to, or nearly to, the surface in the rainy season, where house walls are damp, green, and mouldy, where the floors on which the family sleep are damp, or wet, or at or below the ground level, and where, besides these conditions of site, there are foul water holes among the houses, and where the subsoil and subsoil water are polluted by the filth of households and of animals. It will probably be found that the most fatal fevers, especially those attended by enteric complications, are connected with this filth element.

5. Where entire districts are liable to be waterlogged after continuous rains in the manner described by the Lieutenant Governor in the passage already quoted, the only way of dealing with the evil is by Government action, as is now being done in similar cases in the North-West Provinces. But merely local causes are directly within the sphere of duty of the Sanitary Commissioner, and although no account is given of these local causes in the Acting Sanitary Commissioner's Report, it will be seen from what has been already stated that the statistical data which he has introduced afford ample ground for his own future proceedings. One thing is certain, that the mere occurrence of these fever death-rates argues the necessity for unremitting exertion in discovering and removing their local causes.

6. *Cholera.*—The following table shows the monthly incidence of cholera mortality in the Punjab for 1876 :—

	Deaths.		Deaths.
January	4	July	1,096
February	7	August	1,396
March	2	September	1,421
April	6	October	1,277
May	8	November	280
June	236	December	3

The total cholera mortality of the year was 5,736, but it is considered that some of the deaths during the first five months scarcely come under the category of cholera. For every cholera death there were 61 deaths from fever.

7. Mr. Bellew's Report contains some interesting and important facts about this epidemic which may be noticed. Its distribution differed entirely from that of fever. Fever existed in all the circles, 240 in number, whereas cholera deaths were returned from 88 circles only.

The following abstract of cholera deaths will show the distribution of the epidemic :—

Registration Districts.	Deaths from Cholera.	Registration Districts.	Deaths from Cholera.
Gurgaon	13	Montgomery	1
Delhi	2	Mooltan	32
Rohtak	17	Muzuffergurh	—
Hissar	—	Jhang	3
Sirsa	1	Gujeranwalla	272
Kurnool	1	Sealkot	463
Umballa	7	Gujerat	572
Simla	—	Shanpur	504
Loodiana	2	Jhelum	301
Ferozepore	—	Rawulpindee	626
Jullundur	20	Hazara	245
Hoshiarpur	—	Peshawur	638
Kangra	3	Kohat	24
Gurdaspur	14	Bamur	998
Umritsur	30	Dera Ismail Khan	240
Lahore	722	Dera Ghazi Khan	5

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This table shows that the east and south-east districts of the country almost escaped cholera; that proceeding towards the north-west, the villages and towns in Lahore district suffered severely; that the force of the epidemic fell on the Sub-Himalayan districts (including Cashmere); that it existed in force along the Jhelum, and on the north-east frontier from Peshawur to Dera Ismail Khan. The chief facts regarding the epidemic are given by Mr. Bellew from reports furnished by medical and other local officers, and, as usual, the course of the disease is supposed to be explained by the theory of importation, but Mr. Bellew has grappled with the facts and dates, and has shown that they are incapable of any such explanation. The epidemic are nowhere very severe, and as there was opportunity of dealing with its local causes, the officers might have said something under this head. But much of importance will not be found in the abstracts, and it is to be feared that not much good will come in this matter until the great truth be realised that, whether cholera be transportable or not, the duty of all persons engaged in any sanitary work is to see what were the local causes which augmented its virulence, and what can be done to remove them. The work is a purely practical one, and it only serves to turn attention from it by introducing questions of "poisons," "germs," and the like.

The chief points which the Local Government should be kept informed of are:—

(1.) As accurate a history as possible of the epidemic in each district, with special reference to correctness of dates and events.

(2.) The sanitary state of the population in towns and villages in regard to dwellings, cleanliness, drainage, and water supply.

(3.) The means taken to improve the villages and to lessen the force of the epidemic, bearing in mind that the fundamental improvement is cleanliness, together with protection of the water supply, and thinning or removal of the people out of affected quarters.

8. One of the most interesting parts of Mr. Bellew's report is the account he gives of the epidemic at Murree, which may be briefly abstracted as a contribution to the cholera inquiry. Murree sanitarium occupies a site between 7,000 and 7,500 feet above sea level, in a fine climate, with every facility for drainage and water supply. Its rainfall during the summer months is about 35 inches; the average temperature is 65½ F., and with these natural advantages it has been visited since its formation in 1851 with four destructive epidemics of cholera.

The first outbreak took place in 1858 in June, July, and August. The detachment occupying the barracks, 254 strong, had 43 cases, 35 of which, including cases of a woman and child, proved fatal. Thirteen per cent of the troops died.

In the same months, July, August, and September 1867, the second outbreak took place, during which 11 Europeans and Eurasians and 90 Natives died. It is an instructive point in the history of this outbreak that the depôt was marched to ground 1,000 feet higher, and none were attacked after removal, but two medical officers, the chaplain, and a woman and child, who remained behind, all died. While in camp, there was no cholera, only diarrhœa among the troops, but an officer's servant sent on a message to Murree remained there all night, returned to camp the next morning, was seized there with cholera, and died the same day. With these facts before us, the questions as to the effect of locality in this outbreak and the cause why the locality was so deadly are pointedly suggested. The experience is by no means singular.

The third outbreak took place in 1872, during which there were 28 deaths (including two women and three children in the depôt) among British troops, out of a total of 46 cases, besides 56 deaths among the civil population. The disease cropped up all over the station simultaneously, without communication between the cases, and "none of the orderlies or fatigue men, who nursed their stricken "comrades with the greatest devotion, were attacked, nor any one in attendance on the sick in any "part of the station." The water was carefully filtered for barrack use.

During the first outbreak the weather was very sultry, followed by heavy rains and thunder, with thick mists and fogs.

During the second, "the weather during June and July, when the cholera was prevalent, was hazy, "close, and hot, and the rains were heavier than usual."

"Two days before the third attack a dense brown mist overhung the valley of the Jhelum, the "atmosphere at Murree being extremely close and oppressive, while the wind blew, though not "strongly, from the infected localities."

The sanitary accompaniments of this third outbreak (1872) were thus described by Dr. Fairweather at the time: "And it (the cholera) then for the first time was principally confined to the line of "drainage which passes down from the post office to the Rawulpindee road;" and Mr. Bellew adds: "The site is one of the most overbuilt, overcrowded, and dirty in all the station."

9. We now come to the last attack, that of 1876, which was specially investigated by Mr. Bellew by direction of the Government.

In the early part of 1876 cholera prevailed in Cashmere, and on 22nd April a strict quarantine was established at the bridge and at all ferries across the Jhelum. They "were closed to all traffic what-"ever." This quarantine "was strictly maintained" up to 19th July, *i.e.*, five days after cholera had appeared in Murree, and it was then removed. There were 1,385 persons kept in quarantine, and there was not a single case of cholera at the quarantine stations. There were two mild cases of fever, and one of diarrhœa.

On 13th July the first case of cholera at Murree took place in a water-carrier at Powell's Hotel. On the 15th, two daughters of the hotel-keeper were seized, and all the cases died. There was another case on the 15th, one on the 16th, one on the 17th, four on the 18th, and on the 23rd there were 22 cases, 6 of which, all Natives, died. On the same day, the 23rd July, the disease appeared in the European depôt, one woman and two children having been attacked. Attacks took place, not together, but in separate buildings. On the 25th and 26th, when there was a lull in the disease, the troops were moved three miles away, to Topah hill. On the day of their arrival in camp, there were 3 cases and one death among them; on the three succeeding days there were 8 cases and 7 deaths. No fresh case took place among troops after the 31st July, and the last death was on 1st August. In the 10 days of the disease there were 24 cases, and no fewer than 22 deaths among Europeans of the depôt. The total

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deaths among European troops are given by Dr. Bryden as 12 at the station out of a strength of 1,250, and 17 at the depôt out of a strength of 430.

Among civilians, Europeans and Natives, the disease lasted till 18th August. Among the former class there were 9 cases and 7 deaths, and among Natives 190 cases and 111 deaths, out of a population of 10,605.

There were thus altogether 223 cases and 140 deaths, including those among troops, but this number would have to be increased by 7 deaths if Dr. Bryden's data be adopted.

10. In seeking for a cause of this severe outbreak Mr. Bellew simply repeats an opinion, without vouching for its truth, that the disease was conveyed in luggage left at the hotel on the 13th July, not opened, so far as is stated. No one connected with it had any disease. One thing is clear, viz., that quarantine did not stop cholera in this case. He says :—"Nothing is known as to the cause of the "sudden outbreak of this disease at Murree, though the popular belief points to its importation by "coolies from Cashmere, without, however, a vestige of proof in support. Nothing was observed "during the course of the epidemic to favour the notion of its spread by contagion. Out of a total of "48 persons employed in the Civil Hospital establishment, and in more or less constant attendance on "the sick, only one was seized with cholera (to which he succumbed), and he was a water-carrier, and "only one, a dooly bearer, was attacked with diarrhœa, and he recovered. In the convalescent "depôt none of the attendants on the sick were attacked." It is evident that no help can be derived from the contagion theory towards understanding this outbreak. It appears, however, that the weather maintained the same character as it did at former epidemics. It is described as "characterised by an "oppressive, close, and sultry condition of the atmosphere, which has been more or less densely "obscured by frequent mists and fogs, whilst unusually heavy rains, with occasional storms of thunder "and lightning, but little or no winds, have occurred to make up the sum of the most apparent "meteorological phenomena of the season."

Among general conditions influencing epidemic susceptibility at this station, we must, on the existing evidence, class a still, oppressive, close, state of the atmosphere, with much ground moisture, which is an important element to consider when buildings are built on sloping ground. Each of the four epidemic visitations have presented the same or closely allied features in the weather. But, on the other hand, we have no proof that atmospheric conditions *per se* have ever given rise to cholera. Whatever influence they possess acts indirectly and through the agency of other conditions which they develop or intensify.

Indian hill stations have long been known by their defective sanitary arrangements, and in times past Murree, although lately improved in some matters, has been no exception to this rule.

The present Report might well have contained an exhaustive discussion on the sanitary state of the station, with plans and sections to show the various levels, and their relation to each other. Most of it, however, is occupied with a history of the disease, and there are only a few general statements on the sanitary condition of the dwellings. Here, however, is one. The club and the houses near it on the drainage gully leading from the church to Rawulpindee cart road were more severely affected than any other part of the station. No less than 13 cases of cholera, 9 of which proved fatal, occurred amongst the domestics on the club premises, besides the case of an officer (who recovered) living in club quarters. An equal number of cases (including a European Officer who died) occurred in the curve of houses from the Commissariat mule sheds round to the compound of "Lockwood." Most of these cases proved fatal. We have already seen one of these places described by Mr. Bellew as one the most overbuilt, overcrowded, and dirty in all the station, but in respect of overcrowding and defective sanitation he states that "Murree was, in these aspects, in a better condition before and "during the last cholera outbreak than it had ever been before. Leaky and overcrowded barracks "had been repaired and enlarged, pools and puddles had been drained or filled up, and offal filth of "all sorts had been permanently removed away to a distance from the station, whilst its general "conservancy arrangements had been greatly improved. The water supply had been protected from "many sources of former pollution, and, so far as concerns the supply set apart for the use of the "depôt, was as pure as it issues from the spring."

11. The following are Mr. Bellew's own conclusions on the subject:—

"1st. That the disease or its cause was not imported into Murree, but originated there "independently."

"2nd. That it became localised there as a centre of activity."

"3rd. That it was spread by means of atmospheric influences, aided by the direct action of cholera "dejecta from the human body, as well as by errors in diet, clothing, and bodily exertion." But of the effect of cholera excreta in this process no proof is attempted; it is merely an opinion, while the facts already stated about the sick attendants are apparently opposed to its accuracy.

12. After all, however, the chief question remains, namely, why at such an elevation there should be cholera epidemics?

And to this question the present Report furnishes no reply. Before the absence of sufficient local cause can be admitted, we must have much fuller information on everything connected with the station and its surroundings than we possess at present. And the practical result we desire to draw from the fact is that, seeing the importance of this sanitarium to the army, the Government should, once for all, have a survey made of the whole ground, with sections, plans, &c., showing the general arrangements of buildings with reference to sloping ground, ravines, gulleys, trees, and other vegetation, the drainage lines, and nature of drainage, and water-supply works. The condition of ravines below the station should be carefully examined, the state of the ground about and under the foundation of dwelling-houses, the state of cleansing of all back premises, huts, cattle sheds, &c., and a careful report on the whole with engineering details should be drawn up.

13. It is of course premature to form any opinion on the subject, but it may be useful, merely as affording a hint or two, to state what appears to be the result of the past epidemic history of Murree. From some cause or other, probably from superabundant vegetation, the station is not sufficiently open

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to the winds. It is, however, open to air currents coming up the ravines from the low country, these currents bringing with them a damp unwholesome malarial atmosphere, partly due to impurities in the ravines, probable ground damp under houses from their position, probably filth in native dwellings and premises, and the conditions under which natives live in these respects not differing much from similar conditions elsewhere ; together with these concomitants, a still, close, damp atmosphere, and cholera in the air, as shown by its attacking places in the vicinity.

What sanitary improvements may be required in drainage, water supply, cleansing, opening up the ventilation, &c., can only be judged of after skilled report, but there is one measure which may be at once recommended, and it is as follows.

14. For some reason or other the soldiers quartered in the present buildings are particularly liable to cholera during epidemic seasons, while at other times they are free of the disease. It seems reasonable therefore to consider removal of troops on the first suspicion of cholera in the vicinity as a measure of cardinal importance. In 1876 the disease had been ten days committing ravages in the station before the depôt was attacked, and it was not until the occurrence of six deaths, and after a lapse of three days from the attack of the depôt, that the troops were finally removed. We shall leave this subject with one pertinent question, viz., what would have been the probable result to the troops if they had been all camped out 10 days before?

15. Peshawur, with a population of 58,430, had in all 187 deaths from cholera, viz., 59 in September, 123 in October, and 5 in November. Considering what has been the past epidemic history of this place, the mortality was not excessive. Whether this was altogether due to sanitary improvement we have not yet had sufficient experience, but it is satisfactory to be informed that "in its sanitary "condition the city of Peshawur has been greatly improved of late," by rebuilding the burnt part of it on better plans, and by the drainage works, but "the water supply of the city still remains little "changed. It is still, as used by a very large portion of the citizens, nothing less than diluted sewage, "and unhappily not very diluted either." After the reported progress made by the new waterworks this condition of the water supply ought to have ceased by this time.

The facts about Murree and Peshawur are those of most practical importance in the Report. As already stated, the sanitary information about attacked towns and villages is not sufficient for use.

16. *Small-pox.*—The small-pox deaths in 1876 were 10,254. There were 398,167 primary, and 7,783 secondary vaccinations in the year. Above 9 per cent. of the former and 7·3 per cent. of the latter were successful.

Since vaccination was introduced in the Punjab the small-pox deaths registered have stood as follows:—

Years.	Deaths from Small-pox.	Years.	Deaths from Small-pox.
1869	53,195	1873	25,699
1870	27,163	1874	12,026
1871	25,534	1875	13,594
1872	23,728	1876	10,254

apparently a not unsuccessful result of vaccination.

17. *Bowel complaints.*—Of the 27,221 deaths registered under this head in all the circles, with two or three exceptions, Mr. Bellew says that "they are found to prevail in localities of very different and "opposite characters in point of soil, humidity, and altitude, but have one special period in common, "in which they flourish altogether independent of sanitary condition of locality. This period is the "autumn season from September to December, and the prime factor in the production of these "diseases is chill." This may be true, but it does not follow that insanitary conditions are inoperative.

18. *Snake-bite.*—The deaths from this cause were 828 against 979 in the preceding year. It would have been interesting to have given the number of poisonous snakes killed in the two years.

19. *Hydrophobia* furnished 161 deaths, 1 fewer than during 1875, but the mortality from this cause is very large.

20. *Lawrence Military Asylum, Sanawar.*—The average strength of children under 5 years of age in this asylum was 10. Between 5 and 10, 141 ; 10 to 15, 211 ; and 15 to 20, 54. Together, 416. There were 2 deaths, both in boys, 1 from dysentery and 1 accidental.

The admissions during the year were 398, of which 13 were from chicken-pox, 1 from measles, 1 from enteric fever, 9 from intermittent and remittent fevers. Dysentery yielded 6 admissions, and diarrhœa 70 admissions. There were 10 admissions for epilepsy, a somewhat large proportion.

21. *Asylum at Murree.*—In this asylum there were 55 children between the ages of 5 and 10, 81 between 10 and 15, and 12 between 15 and 20; 148 in all. There was one death from dysentery, in a boy. The only febrile admissions were 7 from intermittent and remittent; and there was no cholera, although the disease prevailed severely at the station. It is satisfactory to learn that at Sanawar enteric fever has all but disappeared, after having occasioned considerable mortality in past years. The disease death-rate in both asylums was about 3½ per 1,000, a very favourable result for the year. It would be important to know what improvements in water supply, &c. have taken place at Sanawar since the amount of typhoid fever there attracted notice.

22. *Sanitary progress.*—Under this heading a very brief abstract is introduced, showing the class of improvements carried out in 41 towns and places in the Punjab. They consist, mainly, in simple works of paving and surface draining, latrines, cleansing and improving wells and water sources, filling up holes, &c.

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Perhaps one of the most important measures has been the circulation of Dr. De Renzy's pamphlet, in which he has laid down simple and inexpensive measures for villages, and it is satisfactory to learn that in a few districts the local authorities are endeavouring to carry out some of Dr. De Renzy's recommendations. Among proposed permanent works mention may be made of the water supply and sewerage of Lahore, a scheme for which has been sanctioned and will be taken in hand as soon as the orders of the Government of India have been received. The works for Delhi, as last revised, are under consideration; likewise those for Rawulpindee and Peshawur. In the latter city pucca drains were constructed for the flow of ablution and other water, ditches were filled up, and low and marshy tracts were drained. Certain streets and bazaars were widened, and the main sewer running outside the city was improved. An urgent want of the population of this large city is pure water for domestic purposes.

23. The Report for the present year is concluded with an account of the Officiating Sanitary Commissioners' personal proceedings and inspections, of which the most important, next to the inquiry at Murree, already described, is the inspection of Jullundur, a town with 35,222 inhabitants, besides 15,702 in the suburbs. In 1876 there were 3,732 deaths from fever in the town, a death-rate of about 106 per 1,000 from this one cause. There were, besides, 1,501 fever deaths in the suburbs, a death-rate of 95½ per 1,000. The mortality from all causes was 138 per 1,000 in the town and 112 per 1,000 in the suburbs.

The following is a brief summary of the causes of this enormous loss of life. Mr. Bellew says of the town: "It is now one of the worst collections of filthy dens I have anywhere seen." The surface drainage is bad; the side streets and alleys in a foul and unwholesome state; all the streets, from want of drainage, were polluted with sewage "horribly filthy," and the air poisoned like that of a badly kept latrine. Private dwellings often in a disgustingly foul state from ordure, ashes, &c., lying about; often overcrowded, and, "in too many instances, presented a pitiable scene of filth, poverty, neglect, and "death." The people of sickly appearance; great numbers had enlarged spleens; "numbers moving "about with the hot stage of fever actually upon them." They attributed their sufferings from fever to floods and rains. (The Lieutenant Governor's account of the cause of this has been already given.) Last year the water covered the country outside the walls to a depth of from 3 to 9 feet. There were floods this year also, and the water rose in the town wells (about 500 in number) to from 2 to 4 and 5 cubits above the ordinary level. The wells themselves were out of repair, and many of them fouled by filth entering from the adjacent surface. Latrines in a very bad state, and withal we are told that the municipality has ample funds at its disposal for sanitary works.

The facts in this case are obvious enough. The natural drainages of the country have been interfered with by public works, and no account was taken at the time of the possible consequences to health. When unusual rainfall comes the whole subsoil becomes a swamp under the houses, the water level is raised and the wells become polluted by inwashing of filth from the surface and subsoil, the general sanitary state of the town is neglected, and the people die as of pestilence.

All that can be said is, that such a condition of things ought never to have been allowed to grow up, and that not a day should be lost in devising some engineering remedy for setting free the drainages of the country, and some steps should be taken to induce the municipality to drain the town, cleanse, improve, and protect the wells, and to see that the whole surface of the place, whether public or private, is kept scrupulously clean. The case is an extreme one, even in India, and constitutes a blot which should be removed as soon as possible.

24. The reports on three other towns, Nurmahal, Shaukar, and Kartarpur, show the usual defects in drainage, cleansing, and water-supply.

Peshawur, as already stated, has been much improved in cleanliness, and in surface drainage, except in places still needing these improvements. The suburbs have also been improved.

The suburbs of Lahore are in an unsatisfactory state, and require improvement in many particulars.

25. In conclusion, the practical results of this Report of 1876 are, in the opinion of the Army Sanitary Commission, of great importance, and they beg to recommend as follows:—

(1.) That the fever death-rates be taken as a basis of sanitary improvement, beginning with those municipal towns in which the death-rates are highest, and of which a list has been given.

(2.) That the case of Jullundur be taken in hand at once, and probably important practical experience may be gained in dealing with it, by consulting what has been done recently in the North-West provinces.

(3.) That in all probability the high town death-rates, especially from fever, are due to local causes, so that local improvements of a limited character may be sufficient for health purposes for the present.

(4.) That the condition of many towns, as regards cleansing, surface drainage, and water supply, is enough to account for the death-rates.

(5.) That Dr. De Renzy's plan of giving instruction in sanitary matters to the people should be followed up, and that local authorities and officers should be encouraged to forward improvements.

(6.) That a further account of the reasons why Murree is so very subject to severe cholera outbreaks is required, and the class of remedial measures for improving it should be submitted to Government. That in the mean time past experience appears to justify the recommendation, that if cholera appears anywhere in the vicinity of Murree no time should be lost in camping out the troops.

3rd July 1878.

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No. 6.

Memorandum of the Army Sanitary Commission on the Report of the Sanitary Commissioner for the North-West Provinces for 1876.

Mr. Planck's Report for 1876 is divided under the usual sectional heads, but nearly two-thirds of it are devoted to an account of "mahamurree," as it prevailed in Gurhwal and Kumaon in the early part of 1876, when his inspection of affected localities commenced, and into the local and personal conditions connected with it.

1. The first section of the Report gives an account of the *meteorology* of the year in relation to prevailing diseases. But as yet little use can be made of the facts, for only after careful registration of data for a number of years, and an equally careful discussion of them afterwards, can conclusions reliable for public health purposes be deduced. In the meantime, however, it may not be out of place to direct attention to the circumstance that, in all probality, the solution of the more important questions will be arrived at, not so much from dealing with meteorological and statistical averages including large areas and populations as by careful comparison of local records, and for very limited periods. This would not exclude discussion of more general meteorological phenomena which determine the amount of food of the country, and the relative prevalence of epidemic diseases over large areas.

Mr. Planck calls attention to the fact that the distribution of rainfall in any year is probably the element of most importance, for delayed rainfall has an apparent effect in raising the death-rates. As regards crops, the general principle is stated that their welfare does not depend so much upon the great quantity of rain as upon the time at which it falls. As the subject of climate in relation to disease is now attracting considerable attention, it may be suggested that important information may even now be attainable by comparing the existing daily meteorological records with daily disease statistics at particular stations where such records exist.

The result of Drs. Lewis and Cunningham's inquiry on the subject appears to show that even monthly averages extend over too lengthy periods, and are not sufficient for purposes of comparison.

2. *Jails.*—The average daily strength of prisoners in the jails of the North-West Provinces in 1876 was 21,302 males and 1,068 females; total, 22,370.

The following abstract gives the mortality, from all causes, per 1,000 average strength for seven years, including 1876 :—

	Deaths per 1,000.		
1870	49·1	1874	41·4
1871	41·5	1875	27·1
1872	44·3	1876	25·
1873	45·6		

As usual, these average death-rates give only an imperfect idea of the facts, for Mr. Planck points out that there are 33 jails in which the average death-rate per 1,000 was 17.

The following were the highest death-rates of the year :—

Jails.	Ratio per 1,000.
Meerut central	100·5
„ district	68·8
Shahjehanpore	56·5
Banda	69·1
Hamirpur	54·2
Mirzapur	64·6

The gravity of these results, which in three of the jails have been persistent, has attracted the earnest attention of the authorities.

It is satisfactory to know that the lower death-rates in the 33 jails referred to above have been due to measures of hygiene. There can be no question that the facts regarding the more unhealthy jails show the necessity for exhaustive inquiry, especially as there are strong reasons for believing that this decimation of prisoners, which never was intended to form part of their punishment, may be due to want of drainage in connection with the irrigation works. Bad locality, rise of water level, and wet subsoil appear to be operative in some cases in keeping up these most lamentable death-rates. As the facts are known, and the causes admit of investigation, we must hope for saving of life in future years from the advance of sanitary improvement and of good management.

3. *General Population.*—The deaths registered in 1876, in a population of 30,769,056, were 719,756 = a ratio of 23·3 per 1,000. This is the best registration result yet attained, but it is made up of maxima and minima. In one circle the death-rate was only 4·7 per 1,000. A large number of circles return death-rates under 20 per 1,000, but there are returns considerably above this figure, in some cases double or nearly the double of it. A nearer approach to the real death-rate is afforded by the municipal returns, 79 of which give an average death-rate of 34·2 per 1,000, but in 11 municipal towns the registered rate averaged no less than 52·22 per 1,000 on a conjoint population of 133,167. In 11 cantonments under careful registration the death-rate was 29·16 per 1,000.

In many circles the registration has been a failure for practical sanitary purposes, but in so far as averages can be used for comparison the registration in the North-West Provinces is improving.

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4. The mortality from the chief diseases in 1876 is given in the following abstract:—

Death Causes.	Total Deaths.	Ratio per 1,000 of Population.
Cholera	26,304	0·85
Small-pox	35,174	1·14
Fever	495,469	16·10
Bowel complaints	88,850	2·88
Injuries	13,487	0·43
All other causes	60,472	1·96
Total	719,756	23·39

In this table cholera occupies quite a secondary position of importance. It occasioned only double the deaths from accidents, and for every cholera death there were 19 deaths from diseases classed as fevers.

The course of cholera is shown by an instructive map attached to the Report. The disease existed in force chiefly near the great rivers. It showed itself in the eastern districts in February, but not in the north-west districts till May. In the east districts the maximum was over by July, but it continued in the north-west districts until October.

5. The cholera of 1876 followed the same law of distribution in the North-West Provinces as in other parts of India, viz., it attacked only a certain proportion of the population groups.

The following statements copied from Mr. Planck's Report show the totals of the daily reports from districts :—

Districts.	Total No. of Villages in Districts.	No. of Towns and Villages affected with Cholera.	Villages with more than 5 Deaths.	Villages with more than 10 Deaths.	Villages with more than 20 Deaths.
Kumaon	6,346	120	31	10	1
Terai	594	105	36	18	6
Bareilly	3,082	304	114	60	23
Shahjehanpur	2,004	30	11	8	6
Mainpuri	1,146	2	—	—	—
Furruckabad	1,862	1	—	—	—
Agra	1,436	1	—	—	—
Futtehpur	1,458	209	46	19	5
Hamirpur	752	71	40	24	11
Banda	1,231	96	31	19	7
Allahabad	3,699	483	105	31	11
Jounpur	3,212	158	49	17	6
Basti	7,555	284	126	57	16
Gorakhpur	8,248	60	15	4	2
Azimgurh	6,363	302	106	42	20
Ghazipur	5,206	368	105	39	15
Benares	1,931	213	54	13	5
Mirzapur	5,722	468	168	66	28
Jalaun	923	6	4	2	1
Total	62,770	3,281	1,041	429	163

There are 91,274 centres of population in the provinces, including, apparently, the 62,770 villages in this table. Of these groups 3,281 yielded cholera deaths. Of the total population centres 3·6 per cent. yielded cholera deaths, and if the comparison be limited to the villages the per-centage of these attacked was 5·2, but the cholera attacked places were towns as well as villages.

From any point of view, the facts show that the cholera epidemic of 1876 was the sum total of deaths taking place in 3·6 per cent. of the population centres of the North-West Provinces, and hence the law of attack was determined by locality; and it follows that sanitary improvements carried out in inhabited places are the real safeguards against loss of life from cholera.

This result simply repeats the experience arrived at all over India under our instructions for the Cholera Inquiry. It does not tell us what cholera is, but it clears away much of the old opinion about the spread of cholera, and enables us to lay a sure foundation for mitigating the virulence of epidemics by dealing with cholera in the small number of population groups which it attacks, and it also shows that nothing short of improving the villages themselves, a work which must chiefly be done by the people, will keep any district of India free of cholera.

6. Another important fact in regard to cholera is the incidence of mortality as distinguished from the number of groups of population attacked. Mr. Planck has brought out this point in the table already given, which shows that out of 3,281 attacked groups of population 1,041 had more than 5 deaths each from cholera, 429 had more than 10 deaths, and only 163 had more than 20 deaths. In this last division 163 groups yielded nearly a fourth part of the cholera mortality which took place among 30¾ millions of people. The practical use which Mr. Planck makes of the fact is an obvious one, viz., that "a great "prevalence of this disease undoubtedly points to the necessity of sanitary improvement in the places "affected." He consequently gives their names, and the list may very well be taken as a basis on which to rest sanitary work.

7. *Fever.*—The fever mortality of the year, as already stated, was 495,469 = 16·10 per 1,000 of the population. In other words, nearly two deaths out of every three were due to fever. Every district suffered from it; but as usually happens some districts were more affected than others. The Terai had a fever death-rate of 32·02 per 1,000 of the population, which was the highest rate. It is described

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as "a moist country of excessive vegetation, the home of violent remittent fevers." Cawnpore had a fever mortality of 21·26 per 1,000. But Mr. Planck says this was predicted by him in his 1875 report, in which "it was pointed out that, if excessive canal irrigation was a cause of fatal fever disease, it "might be expected that Cawnpore district would be the next to suffer from this cause." He predicts the same fate for Futtehpur "when the Lower Ganges Canal is brought into operation." The cure for the Terai fever lies in clearing, draining, and cultivating the country. The prevention of fatal fever, or its cure in irrigated districts, lies in works of drainage and in proper regulation of the irrigation. This latter subject has long been a familiar one in the North-West Provinces. In our remarks on the Sanitary Commissioner's Report of last year the subject was discussed, and it was pointed out that, probably, great improvements in health would follow the drainage works in the Upper Doab, undertaken on account of the great prevalance of fever in the districts. The following table gives the facts regarding the fever death-rates per 1,000 before and since drainage was commenced:—

District.	1872.	1873.	1874.	1875.	1876.
Saharunpur - - -	29·76	23·82	18·78	18·21	15·32
Muzuffernuggur - - -	23·94	24·85	27·75	21·04	20·23
Meerut - - -	35·55	25·83	26·82	21·01	13·50
Bulandshuhr - - - -	32·19	32·34	36·92	24·00	18·86
Etah - - - -	22·12	24·23	19·39	19·06	17·71
Aligurh - - - -	19·87	23·15	21·62	16·39	16·01

These death-rates have undergone very marked improvement, and Mr. Planck says that this great result is due, he thinks, to two causes, "the gradual acclimatisation of the inhabitants to the changes "brought about by canal irrigation, and the improved drainage of the land. In the reality of this "drainage, by which many swampy places have been changed to dry land, the Irrigation Department "has conferred a lasting benefit on the people influenced;" and he says, "I think it may be hoped "that with such guiding experience, efficient drainage operations may progress hand in hand with all "new irrigation operations." The two, in short, should always go together, especially in low alluvial districts, with large periodical rainfall, but much might also be done by regulating the supply of irrigation to water the wants of vegetation. In regard to Mr. Planck's reference to the possible effect of "acclimatisation" on health, it seems necessary to recall the position laid down by the Royal Commission on the Sanitary State of the Indian Army, namely, "there is acclimatisation to heat, there is "none to endemic miasmata." The distinction is a most important one, and must be kept in view in all discussions about the sanitary influence of irrigation works.

8. It may be useful to introduce here the cholera deaths which took place in these drained districts in 1876, merely with the view of raising the question of the probable influence of drainage on the amount of cholera:—

Districts.	Population.	Deaths from Cholera in 1876.	Ratio per 1,000 of Population.
Saharunpur - -	883,782	17	·01
Muzuffernuggur - -	690,082	8	·01
Meerut - - -	1,273,914	3	—
Bulandshuhr - - -	936,593	7	—
Etah - - -	703,485	24	·03
Aligurh - - -	1,073,108	54	·05

The facts in this table are surely worthy of separate record simply for the purpose stated. If the death-rate from cholera had been the same in these six drained districts with their population of 5,560,964, as among the 30,761,056 inhabitants of the North-West Provinces, there should have been 4,750 cholera deaths in them, instead of 113, the actual number. Mr. Planck's explanation of the high fever death-rate, 21·26 per 1,000, at Cawnpore has been already given, namely, its relation to excessive canal irrigation, and it is not uninteresting to know that Cawnpore district, with a population of 1,155,439 had 922 deaths from cholera in 1876.

If the amount of cholera is influenced by the relation of drainage to irrigation, it follows that rainfall must exert a somewhat similar influence; at all events, this element requires to be accounted for in any comparison between drained and undrained districts for cholera as well as for fever.

9. *Small-pox and vaccination.*—There were 35,174 deaths from small-pox in 1876, and in the same year 507,748 successful primary vaccinations were performed. "It seems probable," Mr. Planck says, "that about half the infants born in 1875 may have been protected in 1876." Neither the benefits of vaccination nor the deaths from small-pox are equally distributed, however, in many registration circles (721 in number, into which the country is divided) there were few or no small-pox deaths. In many circles the death-rate was from 1 to 5 or 6 per 1,000. In four circles the small-pox death-rates were between 10½ and 16·8 per 1,000. "The usual immunity from this disease enjoyed by Kumaon, "Gurhwal, Dehra Doon, and in some measure Terai, is marked also during 1876. These are the "countries in which the infant population is efficiently protected by vaccination, and the continuous "favourable result here reflects great credit on the vaccination department."

This Department consisted in 1876 of—

1 Superintendent General.
3 Superintendents (English).
36 „ (Native).
5 Native Deputy Superintendents.
517 Native Vaccinators.

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But Mr. Planck states that, while in the Himalayan climates vaccination can be performed throughout the year, it can only be performed successfully in the hot climate of the plains in the five months, November to March inclusive, so that the effect of vaccination, notwithstanding the number and efficiency of the vaccination staff, is suspended during the months of greatest activity of variola. It is the impossibility of vaccinating in the plains throughout the year which prevents the complete vaccination of the infant population.

The statistics of vaccination give the following interesting details. In the hill country, Terai, Kumaon, and Gurhwal, the per-centages of vaccinations to births have been respectively 111·8, 171·1, 253·4, showing that the vaccinators are able to cover the infant population and more, while in plain districts, such as Azimgurh, Basti, and Allahabad, the proportions vaccinated to births were on 24½, 19·9 and 14·9 per cent.

On the whole, however, the vaccination service is doing excellent work, and is becoming yearly more efficient.

10. *Civil sanitary works.*—Under this head a condensed account is given of the sanitary works and proceedings in many localities within the North-West Provinces.

In the district of Kumaon a successful attempt is being made to remove cattle from under dwelling houses, and separate cowhouses are being erected for this purpose.

In Gurhwal a similar improvement, with thorough cleansing of villages, has been carried out.

Improvements in drainage, filling up holes and swamps, and improving the water supply, have been carried out in the Terai.

The water-supply of Bareilly has been improved and improvements in the drainage of Shahjehanpur have been effected.

Improvements in surface drainage and in filling up unwholesome water-holes have been carried out in all the important towns in Budaon.

Similar improvements have been effected in Saharunpur city, and in Deobund an important drainage channel has been completed. In Hurdwar paving and drainage have been attended to, and also at Rampur. Similar work has been done in all the municipalities.

The great drainage works at Meerut have been advanced, those for the city as well as those for the district, and in each case with manifest improvement of the public health. The district death-rate has been reduced to nearly one half; but part may be due to inefficient registration. In the city, the death-rate in 1876 was 35 per 1,000, against 43 during the preceding year. The low-lying parts in Meerut cantonment have been drained. At Sirdhana, both the public health and the municipal revenue have been improved by filling up an offensive pond, and reclaiming valuable land. Similar work of reclamation has been done at Dhaulana and Dasna with great public advantage, as also at Begamabad. The surface drainage in Kutana and Furrucknuggur has been improved. "In short," says Mr. Planck, "I may fairly say that every important centre of population in the district has benefited in some degree "from the energy and strong common sense of Mr. Webster, the magistrate, whom I have known for "ten years as an earnest sanitary improver wherever his authority stretched."

This affords another illustration of the great power for good which is in the hands of local officers in India.

The great drainage work in Bulandshuhr has been making progress with advantage to the public health. The Khurja drainage cutting was nearly completed. In this town, the death rates for the last four years are given as follows:—

	Ratio per 1,000
1873	59·83
1874	107·
1875	28·60
1876	30·04

The usual paving and surface drainage works have been carried out at Agra. Great improvements in drainage, abolishing cess-pits, and the like, have been in progress in Mainpuri town.

At Benares, improvements in drainage and water-supply has been in the stage of discussion for a number of years, but no practical advance has yet been made, although, as Mr. Planck tells us "Benares of all cities of the Indian continent is, in the estimation of the people, most worthy of improve-"ment," and "cholera disease prevails in the city in every year." It is evident that the question of improving Benares requires some external impulse to give it practical movement.

Drainage improvements have been more or less carried out in Mirzapur city and Chunar town. In Goruckpore, a great tank has been reclaimed, with improvement to the health of prisoners in the jail.

Considering the vast population of these provinces, this annual abstract of work done appears not to indicate very great progress. But still the work, such as it is, has been done, and it must be hoped that it will pave the way for more.

The great drainage works in the Upper Doab stand by themselves as Government work. Our remarks apply to the proceedings of municipalities and to villages.

11. Under the head of *General Remarks,* Mr. Planck cites the instance of Moradabad city and other places as examples of flagrant sanitary neglect, but he considers that in other parts of the provinces the work of sanitary improvement has become firmly established in the "important towns."

12. An interesting account follows of the sanitary precautions adopted at the great Delhi Assemblage. All the precautions in the way of selections of camp sites, cleansing, maintaining atmospheric purity, protecting water-supply, latrines, &c., were fully carried out, with this result for the 23 camps:—"The health of the people of these camps was admirable throughout the time of assemblage; one "case of pneumonia which ended in recovery, the man being put under cover, and four cases of "fever, which quickly yielded to quinine, being the only cases brought to notice. A few cases of "sores and contusions the results of kicks or blows completed the sick list." A fuller account of the sanitary proceedings at the Delhi Assemblage is given in our remarks on the Report on the

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Native Army of Bengal, which states the deaths and causes of death in all the camps, British and Native.

13. *Proceedings in reference to mahamurree disease.*—In the course of his duties, Mr. Planck was entrusted with inquiries and precautions for mitigating this pestilence, and his interesting detailed report enables a far more complete idea to be formed of its nature, causes, and prevention than has been hitherto possible. Although the subject is only of limited local importance, it may not be out of place to gather from the experience such rules as may be required for its suppression.

The localities where mahamurree (great mortality) has hitherto occurred are in the hilly districts of Kumaon and Gurhwal, to the north and north-east of Roorkee, Raniket, and Almora, at the north-western extremity of the North-West Provinces, and at no great distance from some of the loftiest summits of the Himalaya.

The affected people live in detached villages, and are engaged in agriculture and stock-keeping. From the general elevation and topographical position of the country its climates differ from those of India, and are considered to approximate more to those of latitudes where plague occurs.

14. The first recorded case of the disease took place at the temple of Kidarnath in 1823, from whence it spread over the district. It reappeared in Gurhwal in 1834–35, and gave rise to 633 deaths. It was described at the time as sudden in its onset, with fever, great thirst, buboes or swellings under the arms or behind the knees, choleraic symptoms, and fatal termination in two, three, or four days. Before the disease appeared among the people the village rats died off.

It again attracted notice in 1849, but it had been more or less prevalent in preceding years, and it was officially reported on in August 1850 by Dr. Renny, who made the inquiry, and who stated that from what he saw, and from the information he gathered, he had formed the opinion that mahamurree was a malignant fever of the typhus character, accompanied by external glandular tumours, and a very fatal disease, generally terminating in death within three or four days of attack, not plague, but malignant typhus of an infectious nature. Treatment was of no use; and he proposed sanitary precautions instead, such as separating the sick from the healthy, removing manure heaps, disinfecting houses by fire, limewashing, &c.

The recorded deaths in nine villages in 1849–50 were 113.

In 1851 Dr. Pearson reported on the nature of mahamurree that it was a typhus fever with buboes, arising from personal filth and filthy dwellings, from fear, poverty of food, and contagion. Further experience next year led to the conclusion that the disease was plague, with *post mortem* appearances of congestion of internal organs, especially of the brain, diseased condition of the blood, and effusion into the serous cavities. The three subsequent years were spent in trying to improve the villages by cleansing, removing cattle from dwellings, ventilation, &c. Many hundred villages were improved, and there is no subsequent record of cases of mahamurree until the mutiny years, when sanitary work was neglected. In 1860, about 1,000 persons had died of the disease. The sanitary measures were resumed with more or less success, but Dr. Pearson, who was charged with their execution, had vaccination duties placed in his hands, and the disease again reappeared, so that when Mr. Planck went into the district in 1877, he reports that the sanitary measures Dr. Pearson had laboured so earnestly to establish were either non-existent or little apparent.

15. Mr. Planck's own report on the district contains an account of 40 villages which had suffered from mahamurree, but it will be sufficient for the present purpose to extract from the reports the general local conditions connected with the appearance of the disease.

These villages consist of single rows of houses, more or fewer, built generally across the steep slope of the ground, without any apparent provision for drainage. The culture is carried on by terracing the slopes, but in all this there is nothing to predispose to disease. There may be certain unascertained peculiarities of climate to be taken into account, but so far as the facts go they point clearly in one direction, and only one. It is possible that the real danger arises from the fact that the people keep cattle, and that the cattle are exposed to destruction by wild animals, to prevent which the houses are constructed to hold both the cattle and their owners. Here is Mr. Planck's account of houses in the first village he inspected, which may be taken to represent more or less accurately the condition of the remainder:—

Houses well built, double storied, one room below, one above, close, unventilated tenements. The lower room used only as a cowhouse, the upper room for family occupation. In the lower room, about five feet high, it had been customary to lodge from four to eight head of cattle or goats at night, with the doorway tightly closed and barred, floors littered with little decaying straw, and much manure moistened by the fluid excretion of cattle. On each side the entrance manure heaps. Upper room roughly divided by wooden slabs into a front and back portion; the former used as the family sleeping place, the latter as a granary, all openings to the outer air closed at night. Floor made of thin wood with pretty numerous cracks, so that the warmth generated by the cattle below could reach to the sleeping people above.

16. The facts, and their probable influence on health, are of so obvious a character that they scarcely require comment. It is not necessary to discuss whether every case of mahamurree is a case of true plague. One thing appears to be shown by all the accounts, namely, that the disease is one of intense blood poisoning, causing death in some cases without much reaction, and in a day or two.

Mr. Planck describes it as follows:—Shivering, followed by intense fever, rapid pulse, hot skin, after 12 hours pain in head, with hot head and congested brain, followed by delirium, insensibility, and death on the third day, and no characteristic marks of plague found on the body. But after the fourth day, swellings followed by suppuration appear. The fatality in 1876–77 was enormous. Forty villages were attacked, and out of 291 cases only 14 recovered.

The attacks are endemic, and have hitherto shown no epidemic tendency—affording another proof of the fatal influence of locality.

17. There is one more point of importance, and that is the probable effect of these cattle emanations on the grain used as food. It is an established custom to moisten the heads of the madhua grain with water while treading them out, and to store the resulting moist grain in considerable quantities in

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baskets around the family sleeping apartment, to slowly ripen and dry, and the question naturally suggests itself whether this vital fermenting process is not seriously vitiated by the foul emanations from the cattle room below. One officer, indeed, Dr. Watson, who supplies some interesting remarks on the disease, considers that the disease may be due to a fungus in the grain. Attacks cannot in every instance be traced to this grain, but the dying off of village rats may appear to favour the view. One instance is mentioned in which grain sent from an infected village was ground at a mill, and thereupon the mill rats died. The subject is worthy of microscopic investigation, and this could easily be done by Drs. Lewis and Cunningham.

Then the cattle themselves and the milk they produce may become unwholesome. Mr. Planck says that on coming out in the morning they are distressed and unrefreshed, as they well may be, and that cattle diseases are prevalent.

18. What has been said is enough to show the nature of the problem to be dealt with. Its elements have been long known, and its difficulties have been of a practical character which appear to require notice.

Mahamurree has been subdued more than once by known sanitary methods, and has re-appeared; and it may be safely stated that so long as the structural conditions of the houses are what they are, the disease will always be reproduced. The following compulsory rules appear to be the most likely to meet the evil:—

1st. That each village should provide safe and wholesome cattle sheds beyonds its boundaries, and never *above* any part of the village site, to right, or left, or below, but never above. This precaution is necessary to prevent foul drainage during the rains passing into the site of the houses.

2nd. The existing foul houses with their foul subsoil can never be safe for human dwellings. In every way, it would be better to build with fresh materials on a fresh site, and with proper foundations; it would be better to remove all temptation to placing cattle under dwelling rooms by having the houses of only one floor.

3rd. Some separate provision for keeping grain apart from family living rooms would be advantageous.

4th. Provision for current cleansing, disposal of manure, and general sanitary supervision should be made.

5th. In the present state of civilisation of the people, inspection of the villages at brief intervals is necessary.

In conclusion, Mr. Planck's Report on the North-West Provinces shows advancing improvement during the year. The Government is earnestly engaged in the work and is doing its part; but it may be suggested whether a little more pressure might not be put on some of the municipalities.

Improvements in registration are required in certain districts.

The epidemic death-rates classified by Mr. Planck show where sanitary work is most needed.

The great fever death-rates should be more completely accounted for, and the necessary public works and village and town improvements pressed forward.

The year's results show the need of continued inspection and supervision by the Sanitary Commissioner.

The enormous death-rates in some of the jails show necessity for a most thorough investigation into their causes with a view to immediate improvements.

And lastly, the inquiries regarding mahamurree show that no such disease ought at the present day to exist. Its nature, causes, and means of prevention are known, and there ought to be no difficulty in abolishing it.

24th June 1878.

No. 7.

Memorandum of the Army Sanitary Commission on the Report of the Sanitary Commissioner for Oude for 1876.

The Oude Report for 1876 is mostly occupied with statistical details. There is little information on the sanitary state of the province beyond what was given by the Commissioner in previous Reports; the district reports sent by the Commissioner are not printed either at length or in abstract, and there is not much which calls for remark by the Army Sanitary Commission.

The following are the more important practical points in the Report.

1. The registered death-rate, 18·21 per 1,000, shows the best result hitherto attained in this department. It is probably little more than half the real rate. The registered death-rates varied between 12 per 1,000 at Sultanpoor, and 23 per 1,000 in Roy Bareilly and Pertabgurh. The registered urban death-rate was 29 per 1,000, and the rural rate was 18 per 1,000. The total deaths registered were:—

Males - - - - -	121,279
Females - - - - -	95,455
Total - - - -	216,734

In the present state of the registration it is unnecessary to enter into details.

2. *Chief diseases.*—Cholera occasioned 22,007 deaths in the province. It prevailed in all the districts, but chiefly in the rural circles, while the towns comparatively suffered little. Few of them it is true can be called populous. Lucknow, the largest by far, with a population of 292,345 had 485 deaths.

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There are no new facts bearing on the local causes of the epidemic. "During the last two seasons, "owing to changes of officers, most of the towns have escaped inspection." Two or three local opinions, but no facts of any importance, are given to show that cholera was carried by pilgrims. But the Report gives the statistics of 15 fairs in Oude at each of which from 12,000 to 200,000 persons were present, and these fairs, with a solitary exception, passed off without any sickness. The exception was Baraich, where "great crowds" were present. It opened on the 12th May, and cholera broke out on the 18th, and on the 22nd May the fair was broken up. There are no details of this fair given, but it may be safely predicted that sufficient reason would have been discovered why Baraich fair suffered, and all the rest escaped, had inquiry been made. The facts about these fairs are entered under the head of sanitary progress, and this assumption appears to be justified. The rule of the fairs was exemption from cholera during a formidable epidemic. In such cases the exceptions became of great importance, and may lead to practical consequences in the application of sanitary measures, or even to further discoveries in the history of this disease.

3. *Fevers.*—There were 162,761 deaths registered as fevers in 1876. An inquiry into the local causes of these fevers, commenced several years ago, has as yet led to no practical result. The Sanitary Commissioner informs us that reports "have not been received from all districts, and most of those "received refer to a portion of the year only, and, thus incomplete, no information of any value is "obtainable from them."

The only remark called for is that, with a fever mortality above seven times greater than the mortality from cholera, it is time apparently that some steps were taken to save life. The adjacent North-West Provinces, and the works being carried out there, might possibly afford lessons applicable in Oude.

4. *Small-pox.*—The registered small-pox mortality amounted to 5,556 deaths, an unusually low number. During the same year there were 63 vaccinators and 4 native superintendents engaged in vaccination work, with a result to show of 18,636 successful operations, and 5,052 unsuccessful or of unknown result. There was a decrease of about a seventh part in the total number of vaccinations, and each vaccinator's work amounted to little more than one operation per day. Part of this result is stated to have been due to want of lymph. Any way it was by no means a success.

5. It is stated, under the head of "sanitary progress," that the total expenditure for sanitary proceedings had been 10,913*l.*, of which 4,034*l.* was for original works, 558*l.* for repairs, and the remainder for other sanitary services. The sum of 407*l.* was recovered by sale of refuse. The largest proportion of the whole amount was spent on Lucknow, mostly on improving the city drainage, and the most satisfactory, if, indeed, it be not the only satisfactory statement made in this volume is in paragraph 6 of the Government letter at the end, as follows :—"The city of Lucknow has been "greatly improved by the money that has been expended on its drainage."

There is nothing more in this Report calling for notice, with the exception of the following point.

In paragraph 7 of the same letter it is stated that, "at most of the large fairs the health of the "visitors was good, but there seems to be little doubt that cholera is often spread by pilgrims on their "return from the shines." This is thought to be partly accounted for by the pilgrims being ill-fed and in a state of nervous excitement, which may to some extent be true, but the real causes of cholera outbreaks at fairs and shrines are perfectly well known. They are overcrowding, filth, poisonous water, absence, in fact, of sanitary precautions which no amount of food can countervail. By directing attention to these defects real benefit to the public health would accrue, and there would be little cholera for pilgrims to "spread."

The proper function of sanitary administration is prevention of disease in localities where such causes as those alluded to exist.

20th February 1878.

No. 8.

MEMORANDUM of the ARMY SANITARY COMMISSION on the REPORT of the SANITARY COMMISSIONER for the CENTRAL PROVINCES for 1876.

1. From the circumstances under which this Report was prepared by Mr. Barter it is necessarily of an imperfect character.

The Sanitary Commissioner for the Central Provinces, Surgeon-Major Townsend, was appointed in February 1877 to officiate in Dr. Cuningham's absence as Sanitary Commissioner with the Government of India. He made over the work in the Central Provinces to Surgeon-Major Brake, from whom Mr. Barter took over the duties in June. Mr. Barter says he has but little to record under the head of general remarks, and that the information at his disposal regarding the personal proceedings of his predecessor is fragmentary, "nor is there anything at my disposal," he says, "regarding the progress of "research into the causes of disease of sufficient importance to merit notice here."

The Report consists of 59 pages besides tables, and the references to sanitary procedure, properly so called, occupy about three pages, in regard to which Mr. Barter says his information has been obtained chiefly from Civil Surgeons' reports, and from some inspection notes furnished by his immediate predecessor. It appears to be necessary to call attention to these facts as supplying an explanation of the absence of any record of local sanitary inquiries, or of any account of measures adopted to mitigate the ravages of epidemics, one of which, the cholera of 1876, caused 20,124 deaths, a death-rate equal to 2·71 per 1,000 of the population.

The Report is mainly occupied by a discussion of the vital statistics of the Central Provinces, and the work of the vaccination service. There is hence little calling for remark by the Army Sanitary Commission, and all that can be done is to take such facts as the Report presents, and to see whether any practical results can be deduced from them.

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2. The population of the Central Provinces in 1872 was 7,408,074. The total registered deaths in 1876 were 225,024=a death-rate of 30·38 per 1,000. Of the total deaths 25,092 are returned for the towns, with a total population of 481,791, affording a town death-rate of no less than 52·08 per 1,000. In 20 sudder towns, with a total population of 338,731, the death-rate was 39·07 per 1,000. The lowest town rate was 17·49 per 1,000 at Seonee; the highest was 79·17 per 1,000 at Wurdha. Jubbulpore, the second largest of these towns, with a population of 43,223, had a death-rate of 59·74 per 1,000. The largest, Nagpur, yielded a death-rate of 38·95 per 1,000, out of a population of 84,441.

The facts taken as a whole would appear to show that the death registration in the Central Provinces has improved considerably of late years, that it is sufficient for many general sanitary purposes, and that it shows a very large annual loss of life, even for India, much of which is, doubtless, due to mitigable or preventable causes. It is probable that population has increased since the census of 1872, and that the death-rates are too high, but the following comparison of the birth and death-rates, if the data are correct, would appear to show a gradual increase of population, even during a year of epidemic cholera.

1876.			
Births.		Deaths.	
Males.	Females.	Males.	Females.
154,890	136,867	120,130	104,894

The total births were 291,757, and the deaths were 225,024, showing an increase of population of 66,733, or an increment for the year of ·9 per cent. Apparently these results are among the best hitherto obtained in India, but too much reliance cannot be placed on them for statistical purposes, especially as there are causes operating on Indian registration which may lead to excess of registration as well as to deficiency. Honest, accurate record of events is what is most required, and this can only come with time.

Under present circumstances not much reliance can be placed on any record of deaths according to age, but the following results for 1876 may be given as an instalment :—

Ages.	Total Deaths.	Deaths per 100 of Total Deaths.
Under 1 year - - - -	62,135	27·6
1 year and under 6 - -	41,456	18·4
6 years and under 12 - - -	15,067	6·7
12 „ „ 20 - -	12,122	5·4
20 „ „ 30 - - -	18,598	8·4
30 „ „ 40 - -	17,025	7·6
40 „ „ 50 - - -	15,220	6·8
50 „ „ 60 - -	15,919	7·0
60 years - - - -	27,182	12·1
	—	100·0

The table shows that 46 per cent. of the total mortality of natives in these provinces is attributed to ages between birth and the completion of the fifth year.

If we select for comparison the children's death-rate in all England before the Public Health Act came into operation, we obtain for similar ages a rate of 44½ per cent. of the total mortality. The comparison is not of much value except to show that an approximation to the real children's death-rate has been obtained in the Central Provinces, which is at least a hopeful feature in the statistics.

3. The following is an abstract of the deaths from the chief diseases in 1876 :—

	Total Deaths.
Cholera - - - -	20,124
Small-pox - - - -	3,819
Fevers - - - - -	149,786
Bowel complaints - - -	19,952
Suicides - - - - -	598
Wounding and accident - -	1,708
Wild beast and snake-bite - - -	1,049
Other causes - - - -	27,988
	225,024

The registered deaths were more numerous than those of any of the preceding five years, but this may be due to more efficient registration. Attention, however, may very well be directed to the fact that 86 per cent. of the registered mortality was due to endemic and epidemic diseases, fevers, small-pox, cholera, and bowel complaints. This high ratio is not likely to be correct. It no doubt shows a

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very high susceptibility in the population to diseases of this class, but it appears to point to a habit of arranging death causes mainly under headings provided in the returns.

4. *Cholera.*—Cholera existed in the Central Provinces in every month of 1876. There were 12 deaths in January. It reached its maximum in July and August, during which months above half the mortality (10,238 deaths) took place; there were still 198 deaths in December, marking the probable passage of the disease into the following January. It prevailed in all the districts, 21 in number, except in Berhanpur, which escaped. Bilaspur, with a population exceeding half a million, registered only one cholera death.

The extent of surface covered by the disease is shown by the fact that, out of 176 registration circles, cholera deaths were reported from 132. But the case was very different with towns and villages; for out of 72 towns, 17 were attacked and 55 escaped; and out of 27,108 villages, cholera deaths were returned from only 1,912. There were thus 27,180 groups of population in the provinces all apparently more or less under the influence of similar local conditions, and more or less in communication, and yet only 1,967, or little more than 7 per cent., were attacked.

The largest comparative mortality took place in Wurdha town, where, out of 3,562 people, 132, or 37 per 1,000, perished.

The facts point to the purely local character of the outbreaks, and give the clue to the remedies. It is impossible to say why the epidemic attacked certain groups of population, and passed over others; but all experience leads to the conclusion that had the attacked groups been supplied with pure water, and efficient conservancy arrangements for cleansing, they too would probably have escaped.

An important fact is mentioned in regard to cholera in Nagpur district. From April to October the consecutive monthly deaths were 2, 2, 1, 9, 101, 62, 38; but suddenly in November, instead of a decline, there was a great increase, and 456 people died of cholera. In the following month the decline continued, and the deaths amounted to 30.

The cause assigned for the November outbreak was a fair held at Ramtek, in Nagpur district, in the last days of August and earlier days of September, at which 175,000 people were present. There is no account given of the condition of the locality, or of the nature of the sanitary regulations adopted. But so much is known about the conditions which determine cholera outbreaks of Native fairs and festivals in India that an account of the regulations might with advantage have been given in the present Report, together with the extent to which they were carried out, and the reasons why they had failed. In all future sanitary reports from India, it is, now-a-days, not too much to expect that outbreaks at fairs should be fully accounted for, especially as it is presumed that no fair or festival now takes place except under strict sanitary rules. In the whole district within which this fair was held there are 1,634 villages, of which 93 only reported 416 cholera deaths out of a population of 432,264. No stronger argument for the sanitary regulation of these assemblages could be adduced.

5. The cholera mortality in rural districts was 2·49 per 1,000 of the population; while in the attacked towns it was 6 per 1,000. It is not always possible to give reasons why the intensity of cholera varies; but, bearing in mind this high cholera death-rate, it seems allowable to cite the rate at Nagpur by way of contrast. This is the largest city in the Central Provinces, and has, as already stated, a population of 84,441. It has a pure water-supply and conservancy arrangements, but no drainage as yet. It had 61 cholera deaths in 1876, or little more than one tenth of the general town rate.

There is very little said about the sanitary condition of attacked localities, except a statement by the Civil Surgeon of one of the districts, that "the sanitary condition of villages in the interior is very "bad; that accumulations of manure are permitted, that the villages are filthy, and water-supply "defective and open to pollution." Another medical officer says that "it is a remarkable fact that "nearly all the villages attacked had a very impure water-supply, and all those which suffered "severely used only nullah water, and some villages having a good supply of pure water, although "surrounded by disease on all sides, quite escaped the infection."

A few similar statements are made regarding other districts. The information is only very imperfect, but as the Sanitary Commissioner, Dr. Townsend, proposes to submit a special report on this epidemic, he will no doubt supply the required details.

6. *Fevers.*—Diseases classed as fevers caused 66 per cent. of the total mortality of the Central Provinces in 1876. The figures are evidently too high, and show that other diseases are classed under the same head.

The reported fever death-rate for the Provinces somewhat exceeded 2 per cent. of the population. The highest rate was 27·27 per 1,000 in Jubbulpore district; the lowest, 9·66 per 1,000, was registered in Sambulpore district. Fever deaths were registered in every one of the 176 registration circles, and the fact affords a striking contrast with the topographical distribution of cholera, that whereas cholera deaths were reported from 7 per cent. only of the villages, fevers deaths were reported from 21,280 villages out of a total number of 27,108, or nearly 80 per cent. of the whole, showing the universality of the local causes.

Fever deaths were returned from all the 72 towns, and the town fever death-rate was above 28 per 1,000. The rates in particular towns varied between 2 per 1,000 at Gadivarwora (population 6,068), and nearly 40 per 1,000 at Wurrora, with a population of 3,584.

There is no account of the nature of these fevers, but, admitting that all are more or less malarial in character, it is almost certain that this great mortality was not due to ague.

If any large proportion of the deaths were due to fever, the type was of a fatal character, and might be due to enteric complications. Seeing that the towns have municipalities and medical officers, it appears not too much to ask, in the interests of public health measures, that the real nature of these fevers should be once for all decided. There ought to be little difficulty in such an inquiry, and the results would serve to give a practical direction to local sanitary work.

7. In a former Memorandum the Commission called attention to the remarkable differences of death-rates from fever in different registration districts, one of which, Sambalpur, had the lowest rate (a fact reproduced in the statistics under review), with the object of ascertaining what the reasons were of the difference. In the present Report the Acting Sanitary Commissioner gives Dr. Townsend's

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views on this subject. He attributes the lower rate at Sambalpur to differences in geological and meteorological elements, difference of races, &c. It appears that the fever mortality at Sambalpur is replaced by deaths from bowel complaints, but the whole facts, he considers, could only be arrived at by investigation on the spot through all seasons of the year. Whether so long an inquiry would be necessary, we have no means of knowing, but the results, if such an investigation were undertaken, would throw a flood of light on the whole causation of Indian fevers, and the Commission can do no more than express an opinion as to its importance. There is no information in the Report which throws any light on the local causes of these fevers.

8. *Bowel Complaints.*—Diseases classed under this head occasioned 19,952 deaths. Fatal cases were registered in all the 176 registration districts, but the distribution of the deaths among groups of population approximated more closely to the distribution of cholera than of fever. Out of 27,108 villages, 5,967, or 22 per cent., yielded bowel complaint deaths. Sambalpur, which yields the lowest mortality from fever, yields the highest mortality, 11·78 per 1,000, from bowel complaints. Bilaspur, which shows a death-rate of 0·61 per 1,000 from bowel complaints, had a death-rate from fevers of 24·31. Deaths from bowel complaints are returned from all the 72 towns, showing an aggregate death ratio of 5·44 per 1,000. The highest rate was 18·01 per 1,000 at Lodhikhera. No information is given in the Report as to the nature of these bowel diseases, or about their removable local causes.

9. *Small-pox* occasioned 3,819 deaths, or 0·51 per 1,000 of the population. Fatal cases occurred in 127 out of 176 districts, but out of 27,108 villages, only 1,226, or 4½ per cent., returned small-pox deaths. All the deaths, except 667, took place in children under 12 years of age. The disease occasioned 217 deaths in 20 towns out of 72. Burhanpur town yielded 170 of those deaths.

The small-pox of 1876 appears to have been part of an epidemic which began five years before, as will be seen by the following abstract of deaths:—

	Deaths from Small-pox.
1872	4,172
1873	9,936
1874	17,696
1875	20,226
1876	3,819

The following is the relation of small-pox mortality for these years to vaccination:—

Total deaths from small-pox, 1872–76	55,849
Total persons vaccinated in same five years	765,687
Ratios per 1,000 of population } Died of small-pox	7·54
Ratios per 1,000 of population } Successful vaccinations	91·38

When compared with the population, large as have been the numbers vaccinated, it would take somewhere about half a century to protect the whole of the people of these provinces.

The vaccination service in 1876–77 included—

144 Vaccinators.
1 Superintendent-General.
18 Superintendents of Districts.
1 Deputy Superintendent.
17 Native Superintendents.

The acting staff amounted to 181. The total primary successful vaccinations were 238,918, and of successful re-vaccinations there were 16,604.

This department of public health administration was therefore in good working condition. The only regret attached to it is that so extensive and active an agency should have been limited to carrying out one protective measure only. Considering the number of villages which must have been visited in the course of the year, it seems as if much real practical good might have been effected if the vaccination officers had looked at the dwellings of the people and their surroundings, as well as at the children, and had, by kindly advice and influence, directed the attention of the people to simple measures for improving their sanitary condition. The new system just introduced in Bombay Presidency for rendering the vaccination department useful for general sanitary purposes would probably afford useful experience in this matter. In the Report on the Central Provinces for 1875 the Sanitary Commissioner expressed his approval of a similar system being adopted, and indeed it was partly acted on; but as no further reference is made to the subject in the present Report, it seems advisable again to allude to it.

10. *Jail Mortality.*—The average daily strength of prisoners in 19 jails of the Central Provinces was 3,778·87.

The admissions were about 934 per 1,000, from the following causes:—

	Number of Admissions.
Cholera	11
Intermittent fever	1,061
Remittent and continued fever	36
Diseases of lungs	224
„ bowels	601
All causes	3,540

The deaths were:—

Cholera	6
All other causes	148
Total	154

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The death causes are not given in detail.

The deaths to average strength were :—

	Ratios per 1,000.
Cholera - - - - -	1·5
All others - - - -	39·2
	40·7

The highest death-rate was 61·7 per 1,000 in Raipur jail, which included 1·3 per 1,000 from cholera. The lowest rate was 11·9 per 1,000 in Betul jail, all from cholera. Respiratory and bowel diseases, together with certain types of fever, appear to be the chief mortality causes in these jails, and their mitigation depends there, as elsewhere, on due attention to space, ventilation, locality, water-supply, food, clothing, shelter.

11. *Sanitary Works (Civil).*—The Acting Sanitary Commissioner has very little to report in the way of improvements in 1876. The most important, perhaps, is that which relates to Nagpur, in which "the water system has been extended, 1,804 yards of iron piping from 2 in. to 5 in. diameter have "been laid down, which, with hydrants and other requisites, cost Rs. 11,750. Very crowded portions "of the city have been now supplied. The Mayo Hospital, outside the city, has also been supplied "with water."

Improvements in water-supply have been carried out in 397 villages, a very small proportion of the total number in the provinces. These improvements include 257 new wells, 158 wells repaired, and 25 tanks excavated or improved. In the same districts where these wells have been provided there are 265 villages, the water-supply of which is "notoriously bad and insufficient."

In 20 towns, with a population of 338,088, the total amount spent on conservancy was 6,696*l.*, or about 4¾*d.* per head of the population.

These statements, as to sanitary works, must be received with the qualification as to imperfect information already mentioned.

12. *Conclusions.*—Taking the facts as they are given, the present Report on the Central Provinces cannot be said to be very hopeful.

No towns can be otherwise than in a bad sanitary condition which yield such death-rates as those in the tables.

So far as can be ascertained, Nagpur is the only town in which the municipal authorities are taking really effectual measures of improvement, and it is surely not too much to say that what has been done by one town can, in a measure, be done by others. What appears to be required is a detailed examination of the sanitary state of these towns, beginning with Jubbulpore. It is evidently not enough to create municipal authorities and to leave them to their own devices. They appear not to know what to do, and it is at this point that the sanitary administration should step in and help them. Sufficient is known about the death-rates to enable this to be done, and until these rates are reduced by sanitary work, properly so called, vaccination and statistical reductions, important as such matters no doubt are, are of quite secondary moment. The Commission, in view of the very unsatisfactory state of the public health, is desirous that the entire subject of sanitary administration in these provinces should be considered on this basis, without, in the slightest degree, undervaluing the work already done. What appears to be necessary is that the present working power should be better directed both in towns and villages. It would be a great gain, for instance, to employ Civil Surgeons as sanitary officers, and to turn the efforts of the entire vaccination service to the prevention of other diseases besides small-pox, which, after all, is by no means the most important death cause in these provinces, and there is no reason why the vaccination service should not render very efficient aid in improving the real sanitary condition of the people without in the slightest degree interfering with vaccination work.

For a number of years past new wells have been provided, and old wells repaired, in many villages, but it is evident that only a small percentage of this work has as yet been done. The sanitary state of these villages generally appears to be very bad. Fevers and other mitigable and preventable endemic diseases abound in them, and it is in the villages that the vaccination service would, apparently, be a most useful sanitary agency.

From the nature of the present Report these remarks must, necessarily, be of a general character, but the practical conclusion is evident enough from the statistics, viz., that the sanitary state of the people is very unsatisfactory, and that it should be improved. We cannot judge how this can best be done. We have suggested, for consideration, the adoption of the Bombay organization at least on trial, and the matter must be left to the Government to deal with in the best practicable manner.

22nd February 1878.

No. 9.

MEMORANDUM of the ARMY SANITARY COMMISSION on the REPORT of the SANITARY COMMISSIONER FOR BERAR for 1876.

1. During the year under review there were 69,832 deaths registered in these districts, but as there has been no census of the population for 10 years (the census population in 1867 was 2,184,945) no reliable ratios can be obtained. On the assumption, however, that the population has remained stationary for the last three years, the comparative death-rates for the whole province would stand as follows :—

	Ratio per 1,000.
1874 - - - -	27·9
1875 - - - -	40·2
1876 - - - -	31·9

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In 1875 the proportion of the total death-rate due to cholera was 10·2 per 1,000.

In 1876 the births registered were 85,326, showing an excess over the deaths of 15,494 births.

2. In the present state of the census and registration, little dependence can be placed on any conclusions they may appear to yield, but it may be stated that the registered deaths for towns and for villages gave precisely the same results, viz., 29·9 per 1,000.

3. The following abstract table gives the total registered deaths from the chief assigned death causes for the two years 1875 and 1876 :—

	1875.	1876.
Cholera	22,465	2,683
Small-pox	927	415
Fevers	26,076	39,875
Bowel complaints	20,818	16,388
Suicide, wounding, accidents	582	735
Snake-bite, &c.	238	208
Other causes	16,962	9,528

Nearly 24 per cent. of the mortality in these two years was due to "bowel complaints," and in 1876 they were fatal to 7·5 per 1,000 of the census population. The present Report contains one fact which may be accepted, so far as it goes, as throwing light on this death cause. It is as follows: "The Ellichpur district shows no deaths from cholera in 1876. The Civil Surgeon called the disease "which was prevalent for some time choleraic diarrhœa, and the deaths from it were registered under "'bowel complaints.' In all about 900 deaths occurred which should have been attributed to cholera." These deaths are included, accordingly, in the cholera mortality of the year. Here, at all events, we have 900 deaths from bowel complaints accounted for. A special inquiry into the subject showed that, of 316 cases of bowel complaints, 53 had been wrongly reported.

Another point of comparison is furnished by a table in the Report giving the results for two years of 27 dispensaries in Berar, at which cases of disease were probably more carefully diagnosed. This table gives the death-rate from "bowel complaints" at 1·1 per cent. of the mortality, while the mortuary registration affords a comparative death-rate of 24 per cent. But, no doubt, as the Commissioner states, these dispensary returns give an imperfect idea of the total mortality due to the admissions; still this would not account for the great difference in the proportions. The facts are of the same nature as those discussed in our Memorandum on the Madras Report of last year, in which reputed deaths from diarrhœa were traced by a more skilful observer to cholera, and they appear to warrant a recommendation that strict inquiry into the nature of deaths from reputed bowel complaints should be made. This is by no means the first time the Commission has deemed it to be necessary to call attention to the subject, on account of its important bearing on local questions relating to disease prevention. All that can be done at present is to concur with the Commissioner in the hope that "now "the Civil Surgeons have to interest themselves in the registration, and taluka officers have to examine "the village registers, it may be hoped that registration under the different headings will be more "carefully attended to than it has been."

4. In our Memorandum on Dr. Abbott's Report of last year the cholera invasion of 1875 was discussed. It occasioned 22,465 deaths from its first appearance on 9th May 1875 down to the month of November, during which month it caused 52 deaths, and then ceased.

The epidemic of 1876 began on 17th May, and continued all the remainder of the year. In December it caused 152 deaths in nine places, and lingered in one place in Bassim District until January 1877.

The mortality, including the 900 bowel complaint deaths already referred to, was 3,583, about a seventh part of that of the preceding year.

5. The following table affords some interesting information on the distribution of cholera during both years :—

Districts.	No. of Villages in the Province.	Villages affected in 1875.	Villages affected in 1876.	Villages affected in 1875, and again in 1876.	Villages affected in 1876, but not in 1875.
Oomraottee	1,060	434	121	64	57
Woon	1,222	293	123	36	87
Bassim	796	245	84	35	49
Akola	980	708	38	25	13
Buldana	894	495	25	14	11
Ellichpur	475	256	—	—	—
Province	5,427	2,431	391	174	217

Unfortunately the return for Ellichpur district is incomplete for 1876, but the table shows that in 1875 about 45 per cent. of the villages in the province were attacked, and 10·2 per 1,000 of the estimated population died.

Leaving out Ellichpur district, the table gives the following results for the two years :—

In 1875 about 44 per cent. of the villages suffered.

In 1876 about 8 per cent. were attacked. Of 391 villages attacked in 1876 there were 174, or 44½ per cent., which suffered in the epidemic of 1875.

The remainder of 217 villages, or 55½ per cent. of those attacked in 1876, were not attacked during the preceding year.

The 2,431 villages attacked in 1875 yielded an average of a little over 9 deaths each.

The 391 villages attacked in 1876 had an average of 6·8 deaths each.

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The results are important as bearing on the question of locality in relation to cholera intensity, for notwithstanding the greatly reduced cholera mortality of 1876, it is obvious that the reduction was to a great extent due to the smaller number of villages attacked. The general intensity of the disease was less than in 1875, but together with this there is the fact that when cholera appeared in a village the lower general intensity of the epidemic afforded no corresponding security to the population. The practical conclusion is that local disease causes ought to be vigorously dealt with in all villages, and that no one in particular can expect exemption in years of low cholera intensity except through improved water-supply, greater cleanliness, and attention to all sanitary details in and around villages.

6. It appears to be necessary to notice, in connection with this subject, a table in which "particulars "of first cases of the disease in some villages" are professed to be given. This is a most important element in the cholera inquiry, and in our instructions we gave special rules for examining the cases, including details of evidence.

The table includes two districts, Oomraottee and Woon, and the following are the reputed facts, with their headings :—

	Oomraottee.	Woon.
"Sprung up in the village" - -	27	60
"People of village went to infected "place and brought disease back "with them" - - -	34	15
"Brought in by travellers" - -	3	46

We have here the reputed origin of cholera in 185 villages. In 87 it is said to have sprung up in the villages. In 49 to have been brought home by the people themselves, and in 49 to have been imported by travellers.

The following is the account given by the Commissioner of the manner in which these very important results have been arrived at :—"As regards the spread of the disease. It is so difficult in "this country to get any accurate information of any occurrence some time after it has happened, "that the headmen of villages in which cholera appears have been directed to record as they occur "the first few cases under certain headings, and to send in a statement prepared from these with the "weekly report after its first appearance. These statements have been most punctually submitted "from the Oomraottee district, and I produce below the information they afford in the following form, "beside what the Civil Surgeon, Woon, exhibits."

The statements already given are abstracted from this form.

It need scarcely be said that a village headman is not the person to deal with certain of the most difficult of ætiological inquiries, and that in all technical investigations into first cases of cholera, it is absolutely indispensable that every step in the proof should be carefully detailed. As the question stands, these reputed facts cannot be accepted as throwing any light on the history of the epidemic of 1876. We must again refer to our instructions for the cholera inquiry, issued in 1869, for information as regards the cautions to be observed in similar inquiries.

7. There is an interesting map in the Report showing the distribution of cholera among the circles which presents some facts of importance. About a fifth part of the area of the Berars is covered by alluvium, and the remainder is trap formation. Contrary to the usual opinion on the topographical distribution of cholera, the weight of the epidemic of 1876 fell not on the alluvial region but on the circles on the trap, many of which afforded cholera death-rates far above those of the alluvial circles. It may be suggested that useful practical points might be obtained by following up this part of the cholera inquiry.

8. The meteorology of 1876 showed all the temperatures of the cholera months in excess of those of the preceding year. The average excess of the period was no less than 8° 3. The mean humidity was very much less. The average deficiency was 11° 5, and during the month of October, when the largest number of cholera deaths took place, the deficiency was 21° 8. Viewed from the practical side, these meteorological elements may be taken as indicating impure water from defect of rainfall There was an increase of rain in July and August, but a marked deficiency subsequently.

9. The Report gives no information on the sanitary condition of attacked villages, and yet this information and the steps taken on it at the time is of far greater moment to the public health of the Berars than any amount of statistical data, or any account of how vaccination is performed or how prisons or dispensaries are administered. The deficiency alluded to, it is right to say, is not chargeable on the Sanitary Commissioner.

10. *Fevers.*—Diseases registered as fevers occasioned 39,875 deaths in 1876. There is no information regarding the local causes of fevers. But in reference to climatic causes, the Commissioner repeats the view already advanced by him, that the year's rainfall affords an index to the fever mortality ; a conclusion which again points to the probable existence of circumscribed sources of malaria in and about villages.

11. *Small-pox.*—The 415 deaths from small-pox in 1876 are considered to be due to two invasions of the disease ; part to the one passing away, and part to a new invasion. The small-pox mortality of the year was the smallest on record, but, nevertheless, the disease was more widely spread over the province than in 1875, or over more than half the registration circles in Berar ; "a fact," says the Commissioner, "which indicates pretty clearly what I have before more than once hinted at, that is, "that there are some other agencies besides contagion at work in producing and extending this "disease." It may be added that similar conclusions have been arrived at by careful observers in India with reference to other reputed infectious diseases.

The vaccination service in the Berars consists of 6 Native Superintendents and 64 Native Vaccinators.

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In the course of the year 2,913 villages were visited by the Native Superintendents, besides those visited by Civil Surgeons.

The total number of vaccinations and re-vaccinations during the year amounted to 81,825, of which 63,429 were reported as successful. The vaccinations amounted to 74 per cent. of the children born. The vaccination service is evidently becoming yearly more effective.

12. *Sanitary Progress.*—Of sanitary work, in its proper acceptation, there is little to report. The most important statement is, that the amount devoted to sanitary work fell from 7,128*l.* in 1875, to 4,981*l.* in 1876. "But still," it is added, "district officers, their assistants and tehsildars, have been "far from inactive in bestirring the people to do what they can towards keeping their villages clean, "and improving the drainage of them here and there." Twenty-five village sites have been increased, and cattle are now housed outside 17 villages.

Dr. Abbott, while admitting the usefulness of what has been done, small as the amount may be, points out the need of better water, money to enable the people to drain their villages, extension of village areas where there is no unassessed land on which to throw refuse matters, and preventing people being crowded up with their cattle at night; and he concludes his report with the following statement:—"The crops are growing almost to the doors of the houses. The cattle occupy a shed in the "yard which is attached to the house. The roads so called are strewn with matters of all sorts, in "different stages of decay. The people have to resort to, for the purposes of nature, the road sides "or other more convenient places. They have no space outside the village to go to, or to remove "the refuse of the cattle to, till the crops are reaped, so that, what with overcrowding, damp, and "stench, the wonder is that as many people as do survive this period of lock-up, as it may be called, "for till the crops have been reaped the people cannot move about freely, or make any attempt to "cleanse their villages."

As already stated, the census of 1867 gave the population of the Berars at 2,184,945, living mostly in 5,427 villages, the social and sanitary surroundings of which are described in these terms. During the last two years 22,465 and 2,683 of them died of cholera, and in the same two years 65,951 of them died of "fevers," and 37,206 of "bowel complaints." With such facts before us it is natural to ask, what the sanitary administration has been doing? The ability and zeal of the Commissioner are well known. What have been his engagements? Here is his own account of them:—"The Sanitary "Commissioner has so much office work to attend to, in addition to his legitimate duties as Sanitary "Commissioner, it is only to be expected that he shall fall short in some respects. He has the "administrative charge of the jails of the province, six in number, and containing a daily average of "nearly 1,000 convicts; the medical and civil administration of the dispensaries, 27 in number, "including the passing of contingent bills, &c.; the charge of a large vaccination department, which "in itself is more than enough to occupy his time; and the registration of vital statistics."

Of all these details, the only one which is directly connected with the prevention of disease is the vaccination service, and, although an important, it is quite a subordinate branch when compared with fundamental sanitary work, which, as indicated by the facts in this Report, ought to consist of ceaseless vigilance over the sanitary state of these villages, their water-supply, cleansing, surface draining, cattle, &c.; and some further and more efficient connection between the Sanitary Commissioner and the executive officers appears to be required.

If the service is to be continued, the Commission would suggest for consideration whether a more efficient basis of action might not be laid, somewhat as follows, for little good can come of it as it is:—

(1st.) The work of the Sanitary Commissioner to be essentially that of examining into local disease causes among all groups of population in the province; aiding the village populations and local village officers by his advice in removing causes of ill-health, reporting to local authorities on measures required and on the steps taken in conformity with his advice and the results to health.

(2nd.) As head of the vaccination service he should have the assistance of the Native Superintendents and Vaccinators to such extent as he considers necessary in examining and reporting on villages visited by them during the year, with reference to disease causes and the advice given by them to the village populations and officers for their removal, on the same principles as have been adopted in Bombay Presidency. Possibly the Civil Surgeons might aid in this work with advantage.

(3rd.) The final revision of registration returns might possibly be undertaken by the Commissioner, but in regard to all other duties and office work required of him, none of it can be done apparently except at the expense of the lives of the people.

Lastly. There are facts enough in Dr. Abbott's Report to enable the executive authority to know in what direction it could best aid the work, and the Commission would suggest that the points regarding village crowding, bad and deficient water-supply, housing of cattle, &c., should be dealt with.

Since the Report of the Sanitary Commissioner on the Hyderabad Assigned Districts has been referred to the Army Sanitary Commission, the reports of municipalities within these districts have been received from the India Office, and as these reports contain points bearing on the sanitary condition of the people, it may be well to include them in the present Memorandum.

There are the following five municipalities in the districts:—

	Population 1875–76.	Deaths per 1,000, 1876.	
		Cholera.	All Causes.
Oomraottee - - -	23,438	4·1	28·1
Akola - - - -	12,236	5·8	39·7
Khamgaon - - -	9,432	3·2	27·2
Ellichpur - - -	27,782	21·7*	55·2
Bassim - - -	8,531	—	37·8
	81,419	—	—

* This is the "bowel complaint" mortality. Cholera is not distinguished, although 900 cases at least took place in the district. The ratios are taken from the Report of the Sanitary Commissioner.

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The total receipts for all municipal purposes was 7,952*l.*, to which was added a balance of 3,182*l.* from previous years, making a total of 11,134*l.* available for expenditure. Of this amount 1,713*l.* was spent on conservancy for all the towns, and 51*l.* on latrine establishment at Khamgaon only.

A few improvements in surface drainage and in wells were carried out, and roads were repaired. The Commissioner of the Assigned Districts states that "conservancy receives due attention from the "Committees; the several towns are well looked after, and are kept as clean as funds will admit."

On the question of health, he further states that, "during the year under report, epidemic cholera "prevailed in all the municipalities in common with the other towns in the province, though in "Oomraottee itself in a somewhat less severe form, and this comparative immunity is attributed to "the conservancy arrangements carried out. Cholera medicines and chlorodyne were freely distributed, "and disinfecting fluids scattered over parts of the towns during the prevalence of the epidemic."

The following notes on sanitary work are taken from the local municipal reports.

Oomraottee.—The Secretary to the municipality reports that the town is swept daily, the "rubbish "removed, and the cleansing of the latrines is rendered as effective as possible. The latrine has "therefore become a household necessity with the Natives of the town, and several have obtained "permission from the municipality to erect new enclosures for this purpose. The cesspools are daily "drained and disinfected by carbolic acid." "The want of a system of surface drainage is much "felt," leading to large outlay in consequence of injury to roads from heavy rains. The existing drains require survey with the object of utilizing them as far as possible. Roads have been repaired, and a bridge has been built in the town. Ditches have been filled up.

"Nothing has yet been done towards supplying the town with water. It is a need which is severely "felt, and the townspeople are very desirous that early arrangement be made in securing an abundant "supply of good water." It is very satisfactory to be told that surveys, plans, and estimates for this work have been prepared. In this town "the municipal system works well and seems to afford "general satisfaction, and is appreciated, as it is known that all that is done is for the welfare of the "people."

There were 285 cases of cholera in this town in the year 1875–76, of which 60 proved fatal. The type and mortality are said to have been less severe than in the district generally, due, the Secretary thinks, to the conservancy arrangements.

This report, although only of a general character, clearly indicates certain fundamental insanitary conditions, such as the state of the water-supply and drainage, the use of cesspits of any kind or for any purposes, and probably latrine arrangements permitting the ground to be fouled.

The Sanitary Commissioner is the authority most competent to deal with such questions, and to give an account of the reasons why so much cholera (95 deaths) took place in a town under an active municipal administration.

Akola.—The conservancy in this town is said to be "well attended to," latrine cleansing has been taken into the hands of the municipality, but nothing has yet been done to furnish the increased population with an adequate supply of water. "Every one complains of the inadequate supply of "water in Akola from year to year." The Native Vice-President of the Committee calculates the water tax for a particular scheme, which, however, it was found was not a practicable one, at 1,200*l.* a year, "and I am confident," he says, "that the people will pay it very gladly." He further reports that the members of the Committee and the establishment "have done well."

Khamgaon.—Daily cleansing of latrines has been adopted in this town and "has greatly improved "the sanitary state of the town." "The conservancy establishment is adequate to meet the wants of "the town." Roads have been repaired and metalled. A beginning has been made in surface drainage by "pucca" drains; wells have been sunk, and trees planted.

Ellichpur.—The Deputy Commissioner of the district says that "the means at the Committee's "disposal to effect anything very marked are entirely wanting, but with what they have they do, I "believe, the best they can, and the condition of the city is a credit to them."

With a population of 27,782 their total income in 1875–76 was 1,174*l.*, raised to 1,579*l.* by a previous balance. Out of this small sum they spent 316*l.* on conservancy, and 40*l.* in making ditches. The Native Secretary to the municipality states that, "notwithstanding the limited funds at the disposal "of the municipality, much improvement has been effected in the sanitary condition of the city. All "the streets are daily swept, and the rubbish collected in appointed places, from whence it is taken "away by the contractor, who has purchased the right of removing it for Rs. 60."

"The Committee is happy to hear that a project for water-supply, which consists in repairing a "decayed watercourse planned by the former Government, has been again taken in hand, and the "municipality is willing to contribute its quota of the expenses necessary for carrying out the scheme "in proportion to its means." The Deputy Commissioner says that "the restoration of the water-"supply will be an immense boon."

Bassim.—The Officiating Deputy Commissioner states that considerable improvements have been effected in the year. Roads were raised, repaired, and widened where necessary. The conservancy establishment cost 113*l.* for a population of 8,531, about 3¼*d.* per head, not an extravagant outlay. We are nevertheless told that in point of cleanliness the town is in no way behind the other large towns in the province. There was a balance in hand of 303*l.*, which it proposed to spend in the drainage of the town. In this as in other towns the Committee is considered as doing good work.

So far as sanitary results are concerned, all these towns have high death-rates, and all, with one exception, have suffered severely with cholera; and yet, so far as the municipal reports are concerned, the Sanitary Commissioner appears to have had no function in any of them. The Municipal Committees appear to do their work with such lights as they have, and as all the revenues are scanty they are obliged to work within the limits of a rigid economy. So far as any conclusion can be drawn from the facts, disease causes of a remediable character are mainly connected with bad and deficient water, defective drainage, and in all probability with a foul state of subsoil, the result of defective latrine arrangements in past times.

It may be suggested whether the Government could not place technical assistance at the disposal of the Municipal Committees to enable them to deal with questions of water-supply, surface drainage,

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and drainage outfalls. There is no prospect apparently at present of the introduction of house drainage, and this being the case, latrines should in every instance be so constructed and worked as to prevent the matter, whether solid or liquid, coming in contact with the subsoil. This, with daily removal, is the only substitute apparently available at present for a complete system of house drainage for removing sewage. Other refuse water must either be carried away out of the towns, or allowed to pass to the outlets by impervious saucer sectioned surface drains.

No cesspits should ever be permitted for the reception of house slops, and no amount of carbolic acid the municipalities could afford to use would materially reduce the risks attending cesspits or surface filth.

Even after the passage of foul matter into the subsoil has been put an end to, it will probably take many years before the subsoil which has been polluted will have become healthy, and will have ceased to endanger the purity of existing wells.

Where new wells have to be made, the precautions recommended in the note on water filtration appended to the Commission's Memorandum on Dr. Cuningham's Report for 1876 (India Office Sanitary Reports, Vol. IX.) should in every case be observed.

27th February 1878.

No. 10.

Memorandum of the Army Sanitary Commission on the Report of the Calcutta Municipality for 1876.

1. The year 1876 was marked by two events of great importance to future progress of sanitary work in the metropolis of India.

The municipality was remodelled on the elective principle, and on 6th April 1876 an approximate census of the population was taken. The last of these proceedings has placed the fundamental data on which sanitary improvement must be based in the hands of the authorities, but the final results to public health of course will depend very much on the use made of the information.

It is proposed in the remarks which follow to deal with the facts bearing on the present sanitary state of the city as these are detailed in the able and exhaustive report of Dr. Payne, Health Officer of Calcutta, and in doing this to express the opinion of the Army Sanitary Commission that the new municipality can have no better guidance for their work than the data which Dr. Payne has laid before them.

2. The following tabular abstract gives the result of the census of 1876 :—

	Total Population.	Males.	Females.
Town of Calcutta - - -	409,036	262,455	146,581
Fort William - - -	2,803	2,408	395
Port of Calcutta - - - -	17,696	17,643	53
Grand Total - -	429,535	282,506	147,029

The first fact which comes out prominently in this abstract is that nearly two-thirds of the census population consists of males, and thus figures have been reproduced which led the Commission many years ago to doubt the accuracy of the census at that period. It can easily be understood how the male military population of Fort William so greatly exceeds the females married in regiments, and also how so small a number of females are found among the shipping; in the town of Calcutta itself, however, the explanation of the difference is not at first sight so easy, but some clue may possibly be obtained from the following rough ratios of the sexes to each other :—

	Males.	Females.
Town of Calcutta:		
Population - - -	262	146
Births - - - -	301	343

These data, if subdivided among the races, give the following singular results:—

	Males.	Females.
Non-Asiatics:		
Population - - -	658	280
Births - - -	142	150
Mixed races:		
Population - - -	550	577
Births - - -	268	307
Hindus:		
Population - -	177	100
Births - - -	248	211
Mahomedans:		
Population - - - -	885	350
Births - - - -	111	84
Other classes:		
Population - - -	435	279
Births - - -	11	16

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If, not the numbers, but the ratios of male to female births are approximately correct, the result is self-evident, namely, that while 30 males are born to 34 females, the proportions in the general population from which the disease and death ratios have to be calculated are, in round numbers, 26 males to 14 females. It hence appears that a large proportion of the male population of Calcutta on the census day did not really belong to it, but to places outside municipal limits; and if this be the case the influence on death-rates in Calcutta itself must be to keep them below the average due to the population, for many deaths due to Calcutta from residence may after all be counted against the outside town or village where these deaths took place. In this comparison the effect of hospital mortality (which no doubt includes many deaths of persons not inhabitants of Calcutta) must not be overlooked, as to some extent compensating for outside deaths.

3. Although it may be impossible at present to estimate the death-rate due to Calcutta, nevertheless, on the assumption that the disturbing causes stated act with tolerable regularity, we may obtain comparisons sufficient for most public health purposes from existing data. On the general question we concur with the Health Officer's opinion that, considering the composition of the Calcutta population, "all detailed statements of absolute numbers of deaths embrace only the cases of persons who die in "the town, which of necessity are but a portion of the deaths caused in the town."

4. *Mortality in* 1876.—During this year the deaths were,—

Males - - - - -	7,502
Females - - - -	4,562
Total - - -	12,064

= 30·2 per 1,000 of the population.

But excluding Fort William and the Port, the deaths in Calcutta proper were,—

Males - - - - -	7,297
Females - - - -	5,450
Total - - -	12,747

= 31·2 per 1,000, and for—

Males - - -	27·8 per 1,000
Females - - - -	37·2 „

These death ratios afford further evidence that many males counted as living in Calcutta do not die there, and they afford at the same time strong ground for assuming the female death-rate, 37·2 per 1,000, as nearer the real death-rate of the town than the general ratio for both sexes. Dr. Payne, himself, estimates the Native death-rate at 5 per cent., but this is probably too high except in special localities.

5. Against these high death ratios for the town generally it is satisfactory to place the death ratios among the whole population in Fort William, which are as follows:—

Male deaths - - -	4·1 per 1,000
Female „ - - - -	5· „

If any fact can show more clearly than another to the municipality the benefit of sanitary improvements it is surely this one. In former times the death-rate among troops alone in Fort William was 102 per 1,000, or about threefold the present Calcutta death-rate.

The sanitary state of the Fort has been completely changed of late years, and now the death ratio, including that of British troops, is less than one seventh part of the Calcutta rate, and one twenty-fifth part of the old Fort William death-rate among British troops.

6. Divided among the different races which inhabit Calcutta, the population and death ratios per 1,000 stand as follows:—

Races.	Male Population.	Female Population.	Total Population.	Deaths per 1,000.		
				Males.	Females.	Combined.
Non-Asiatics -	6,532	2,803	9,335	26·2	12·8	22·2
Mixed Races - -	5,502	5,771	11,273	50·2	46·9	48·5
Hindus - -	177,582	100,642	278,224	28·2	36·7	31·3
Mahomedans -	88,539	35,017	123,556	22·8	41·3	28·

A glance at this statement shows that, living under better sanitary conditions, the white races are far more healthy than the Native races in Calcutta, but the fact must be taken into account that, as stated by the Health Officer, "the European population of Calcutta is composed, almost wholly, of "persons at the middle periods of life," including, however, a large proportion of sailors ashore, a class "most prone to death." What Calcutta was to the British race in old times is matter of history. Now, however, under better sanitary surroundings, and with better habits of living, the general death-rate of whites is no higher than that of England. The infant death rates appear to have undergone a striking reduction also. Dr. Payne states that, in 1876, "while in the Native town infants die as "they die only in the most fatal countries, European infants, with 5·8 per cent. of deaths in the year, "enjoy in Calcutta a degree of vitality which surpasses that of the most favoured spots elsewhere. "There is no error from moving population here." As an individual illustration of this fact he cites the following case:—"In the European Orphan Asylum, where children of all ages are maintained, "in a mean daily number of 60 there have been, *during the last nine years, only three fatal cases of "illness.*" These facts may be admitted as proof that, under favourable sanitary conditions, Indian climates are not necessarily so injurious to the health of European children as was formerly supposed, but the years, numbers, and experience are both too limited to enable this view to be generally accepted. More experience is wanted to establish its correctness, although the fact is patent enough that the mortality among European children is, like the mortality among European adults, in striking contrast to the mortality of Natives born to the climate. And this places another argument in the

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hands of the municipality for pressing forward with sanitary work in the Native quarters of Calcutta.

7. When compared with the registered death-rates of the previous eight years the rate for 1876 shows the following result:—

All the rates are calculated on the census population of 1876.

	Deaths per 1,000.
1868	32·
1869	29·8
1870	24·4
1871	24·
1872	27·8
1873	26·9
1874	29·4
1875	35·
1876	30·2

Part of these differences are due, no doubt, to the state of the registration, but, under the existing moveable condition of the population, they can only be accepted for the purposes of comparison with each other on the supposition that the population elements, and the registration, have been tolerably constant during the time.

For reasons already stated none of the annual ratios show the absolute mortality.

8. The following were the deaths registered from special causes in 1876:—

	Number of Deaths.
Cholera	1,851
Diarrhœa and dysentery	1,864
Fevers	4,361
Small-pox	71
Other causes	4,817
	12,964

In 1876 fevers, cholera, diarrhœa, and dysentery caused 8 out of every 12 deaths. These are, hence, the chief death causes with which the municipality will have to deal, and they are all mitigable or preventable.

9. With the view of obtaining more accurate information in regard to the sanitary state of different districts in Calcutta, the Commission suggested in former Memoranda the points requiring investigation, and in the present Report important data are introduced, from which the following death-ratios have been abstracted:—

Registering Sections.	Ratio per 1,000 of Population.				
	Cholera.	Small-pox.	Fevers.	Bowel Complaints.	All Causes.
Shampookur	4·5	—	9·5	5·4	30·9
Coomertolly	4·3	—	7·3	4·	19·4
Burtolla	6·4	·06	11·	5·9	36·4
Sookeas Street	5·2	·90	12·7	5·9	38·7
Jora Bagan (Mayo Hospital)	5·	·10	9·8	5·	30·5
Jora Sanko	3·9	·14	10·1	6·2	31·6
Buna Bazar	2·9	·17	8·9	4·8	23·2
Cooloolola (Medical College) Hospital	4·8	·12	11·6	4·2	38·4
Moocheepara	3·4	·10	11·8	3·5	30·2
Bow Bazaar	3·4	·17	11·	3·8	30·7
Puddoopookur	2·5	·15	11·8	4·9	29·4
Waterloo Street	·	—	2·9	1·6	10·7
Fenwick Bazaar	3·2	·31	9·	2·4	22·6
Toltolla	4·2	·77	13·6	3·4	34·3
Collinga	5·8	·41	11·9	3·	32·8
Park Street	1·1	·45	3·9	1·8	13·4
Bamun Bustee	5·4	—	12·6	3·9	37·6
Hastings	7·3	·40	16·6	11·2	52·5
Fort William	1·4	—	·35	—	4·2
Port of Calcutta	5·8	—	1·8	·67	11·4

This table shows the mortality from small-pox to be little in comparison with that from other causes. The great death cause in the city is fever, from which the highest rate is in Hastings, 16·6 per 1,000, and the lowest in Waterloo Street, 2·9 per 1,000. In Fort William the fever death-rate is so small as scarcely to call for comment. The highest cholera rate was also in Hastings (7·3 per 1,000), and the lowest, 1·1 per 1,000, was in Park Street. The most unhealthy districts in 1876 were Hastings, Bamun Bustee, Sookeas Street, Burtolla, and Toltolla. In none of the town districts was the death-rate so low as in the Port, with, perhaps, one exception, Waterloo Street, where it was a shade lower. In Fort William the deaths from fever were in the same ratio as deaths from injury.

The facts regarding Calcutta proper are, of course, liable to the disturbing influence of population movement, but there is sufficient in them to justify a recommendation that they should, in the meantime, be adopted as a basis of municipal action, and that this annual analysis of the facts should be continued.

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It might even be possible, by carrying the inquiry more into detail, to bring the highest death-rates home to particular properties, as has been done in similar cases elsewhere. The experience of Fort William is very important, but it suggests a question, namely, in a case where so much has been done to improve the health of a station, why was there any cholera there to occasion a third part of the actual deaths?

10. The past history of cholera in Calcutta affords several points of practical importance. The following have been the annual deaths from this disease for the last 12 years:—

Years.	Deaths.	Years.	Deaths.
1865	5,078	1871	800
1866	6,826	1872	1,142
1867	2,270	1873	1,155
1868	4,186	1874	1,329
1869	3,592	1875	1,726
1870	1,563	1876	1,871
	Total in 12 years - -		31,538

In 1864 the probable mortality from cholera was in round numbers 4,000, but there is reason to believe that the registration of this year, as well as that of 1867, was not very reliable. The probability appears to be that there was an epidemic cycle in progress which reached its highest point in 1866, and then began to decline, reaching its lowest point in 1871, when the deaths were only 800, from which year an increase has set in. Attention must, however, be called to the fact that during the first six years of the period the cholera deaths registered, even imperfectly, were 23,515, while during the second six years with more efficient registration they were 8,023 in number.

Admitting that the figures as they stand, including some correction for 1867, show a cyclical law of epidemic cholera, the first question which presents itself is whether the table shows any disturbance in the cycle, and if so, the question will follow as to the reason why. There is a break in the series in 1870, and a still more remarkable one in 1871, but the records before 1865 are so unsatisfactory that little reliance can be placed on them. Taking into account, however, what the condition of Calcutta was as described in evidence before the Royal Commission of 1859–63, there is every reason to believe that the highest rates of the earlier years of the series given above were no inadequate representation of the rates of the preceding years. We have one trustworthy class of facts from the experience of Fort William, viz., that during the ten years 1847 to 1856 the death-rate from cholera among troops was 28 per 1,000, while in 1876 it was 1·4 per 1,000, or one twentieth part.

Epidemics move in cycles, but experience has taught us that the cyclical intensity of epidemics is very much under the influence of certain known local causes. The Royal Commission on the Sanitary State of the Indian Army called attention to this peculiarity of epidemics, and stated that, "assuming "the oscillation in intensity simply as a fact, there are certain well defined conditions which influence "most materially not only their intensity but also their frequency."

It is necessary to recur to this point, because the apparent rise in cholera mortality appears to have been laid hold of by persons unacquainted with the laws of epidemics, both for a ground of argument against the utility of sanitary work in Calcutta, and as affording a reason for stopping expenditure. Let it, however, be distinctly understood that sanitary science has never claimed any power over the course of an epidemic. It claims power only over those local conditions and personal habits which augment the severity and frequency of epidemic outbreaks, and it is not without a hope that in time it may be able to so reduce the susceptibility to personal seizures that the cyclical laws of progress may be broken, as it has been in Europe with regard to plague and other pestilential diseases.

Already, in Calcutta, the statistics appear to show a break in the epidemic course, and the Officer of Health informs us, under due reservations, that there is "a general remark respecting cholera in "Calcutta, not only that it has greatly diminished, but that those wide-spread explosions of the "disease which appalled the city from time to time in former years have lately been unheard of." In other words, cholera is assuming the aspect of a disease which, like any other, occasions part of the ordinary mortality of Calcutta, as was the case with western epidemics before they finally took the place they now occupy in our weekly returns of deaths. It is, moreover, a noteworthy fact that for certain sanitary reasons the disease retains its former characteristics in the vicinity of Calcutta. All this is hopeful, but the Officer of Health is quite right in making it a subject of special inquiry.

11. We must now take up the second part of the question, namely, why has there been this change in the epidemic history. Have any steps been taken which might account for it?

While the Royal Commission on the Sanitary State of the Indian Army was still carrying on its inquiry at home and in India (1859–63), the subject had commanded a large share of attention in India, and Dr. Payne states with regard to Calcutta that "with the municipal administration in 1864 "there began an organised system of conservancy. Large accumulations of filth were removed from "the town; open drains, some of which were very freely used as latrines, were cleaned and kept free "from such uses, at least, as this."

The scavenage of the streets was improved, and something was done towards the better purification of private closets and houses generally. During the years immediately following there was a great reduction of the general mortality, thus:—

	Deaths registered from all causes.
1865 - - - -	23,233
1866 - - - -	20,283
1867 - - - -	12,097
1868 - - - -	13,733
1869 - - - -	12,795

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But the deaths from cholera did not show a corresponding reduction.

After improved conservancy followed the drainage of the city. In 1866–68 underground main drainage was completed in the southern division of the town, and from 1869 it was extended northward.

The works, however, were simply main drainage lines, the first effect of which was to drain the subsoil and to lower the water level, while the sewers admitted the rainfall after having aided in cleansing the foul subsoil, and conveyed the whole to the outlet.

It is apparent from the statistical data that there was a reduction in the death-rates registered, but the data are not such as to enable their being used as a proof of causative connection between the two classes of facts; moreover, nothing of what is understood by "house drainage" had been introduced, and the bustees with their large population and unutterable abominations were left untouched.

Thus, houses were still undrained, and the foul water-supply remained up to 1870, on the 1st April of which year "Calcutta found itself in possession of 800 hydrants erected at maximum intervals of "300 yards all along its public roads and lanes, in every one of which there was constant and liberal "supply of filtered water of a high degree of purity." But an occasional supply had been given in September and October 1869, and the supply was really maintained from 1st November 1869. Cholera deaths fell in number during this year. Next year, 1870, they fell to less than one half the number of 1869, and in 1871 the reduction was nearly a half on the returns of 1870. There were only 800 cholera deaths.

There was an increase of 342 deaths in 1872. Up to April 1872 the water-supply was available day and night; at this point, however, the supply began to fail, it was partly suspended during the night, and the presumption is that impure water was again resorted to by a part of the population, and hence the increased mortality.

The supply requires to be doubled in order to exercise its full effect on the sanitary state of the population, and even now many households, from choice or necessity, still use water of which it is said that in quality it is "intermediate between urine and liquid sewage."

12. The evidence, as it stands, is sufficient to justify the strongest presumption that the past works carried out by the municipality have had a most important influence in saving the population from violent epidemic explosions. It is indeed as strong as the evidence usually is in cases where sanitary works are in progress, and would be received in this country as affording every encouragement for completing them.

13. As speculative doctrines about cholera set forth by persons who have had little personal experience of the disease are apt to be substituted for real practical knowledge, and to delay sanitary progress, it may not be out of place to conclude this notice of cholera in Calcutta by quoting the following timely words of the Officer of Health, which no doubt represent the impression produced on his mind by the events against which he is daily struggling:—"The factors which together make the "disease, viz., the local fixed material and the fertilizing element of the season, are yearly either "gathering force or recovering lost facilities. That the latter is the real position seems to me to be "open to no doubt."

"Instead of *factor* and *fixed material*, perhaps the term *conditions of production* would be better "suited to a case in which the immediate instrument of production has not been recognised, but in "connecting disease with a proved source in filth and filthy water it is not easy to speak of an "unknown agency in language that is sufficiently indefinite without risk of confusion. I desire to "say nothing of the instrument by which filth operates to the production of cholera. Whether there "be poison taking particular form as living germs, or what not, is a question which is to my mind yet "unanswered, while the intimate connection of cholera with filth is no more open to doubt than an "axiom in geometry."

14. *Bowel complaints.*—Diarrhœa and dysentery occasioned the same mortality in 1876 as cholera, viz., 1,864 deaths by the former causes to 1,851 deaths by the latter. The tables show a gradual decline in the bowel complaint deaths from 1868 till 1871, and they attained their minimum degree of prevalence in the year of the minimum of cholera. Since then they have increased somewhat irregularly, but have not reached their former degree of prevalence.

Many cases classed under the head of "bowel complaints" are dependent for their prevalence on the same class of local causes, filth, foul water, and the like, as cholera.

15. *Fevers.*—The following deaths have been ascribed to fevers during the last nine years:—

	Number of Deaths from Fever.
1868	3,681
1869	3,837
1870	3,601
1871	4,249
1872	5,103
1873	4,746
1874	4,644
1875	5,432
1876	4,361

Deaths classed as from fevers, it will be seen, show an increase of late years, a fact which has led to the strange deduction that they have been the results of draining the subsoil. Not that this view is held by any one of influence, but if it be true, then it follows that filth, water-logged subsoil, and foul water to drink are preservatives against Indian fevers!

The chief difficulty in dealing with these fevers is that we know so little about their nature and ætiology. Dr. Payne states that, in consequence of the absence of physical diagnosis in Native systems of medicine, "the record of fever deaths is vitiated beyond all semblance of truth." It would be quite safe therefore to discard any discussion as to the relation of fevers to sanitary works. The

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fatal cases, at least many of them, may be due to quite other diseases, provided only they are accompanied by heat of skin. Where fever is truly diagnosed, Dr. Payne says: "Malarial illness is protean "in its forms, and from the most obvious ague to a typical typhoid case there is an unbroken "gradation which makes definition extremely difficult." And as to the local causes, he says: "Where "the condition of the soil as to moisture and filth is as I have described that of Calcutta to be, the "closest combination of the fever causes is of course to be found, and the growing use of the term "'typho-malarial' as applied to a condition which is common here is proof that analysis fails." This, he says, is unfortunate, but the fact remains that over a large area of Calcutta there co-exist with fevers of this aspect the most potent known elements of malarial and typhoid fevers, and, whatever objectors may say, the practical conclusion remains immoveable that, so long as these conditions remain unchanged, so long will these fevers exist. For present practical purposes it is scarcely necessary to go beyond the facts, although it would be a great advance if the precise mortality due to different kinds of fever was arrived at through improved diagnosis. The facts as they stand all point in the same direction, namely, that the best practical way of reducing the fever mortality is to provide the people with pure water to drink, to press on with the drainage works, to fill up all foul tanks, and level and drain the ground, and to cleanse and keep clean the city and its houses and courts. In this must be included an entire reform in the bustees and their water-supply.

16. This subject of the bustees was dealt with in our Memorandum on last year's Municipality Report, and as another contribution to the facts we may cite the following from the Officer of Health's statement, as affording additional evidence, were such necessary, to show that the municipal authorities have plenty of work before them in this direction, and that until it is completed the subject must never be allowed to pass from notice:—"The cowherds' bustees show larger areas of soil infiltrated "with the dung of men and beasts; and into one of Calcutta's widest streets I have found opening a "chamber eight or nine feet long and wide and deep filled with fermenting night-soil, the accumula- "tion of years. * * * No word painting could darken the colouring of a picture which "presents itself, as one of many, in Nundram Sen's Street to the eyes of any one who cares to see it. "A filthy drain passing between the high masonry walls of houses receives the contents of their "privies, which are freely discharged into it through apertures in the walls. To the foot of each "wall, whitening the margin of the black mass of filth which fills the drain, there cling myriads "of maggots. They are heaped along the line and fall in matted clusters into a slender stream which "courses slowly down the surface of the fœtid mass, and with it they are drifted along to a hollow "close at hand, known in local parlance as a tank! The liquid which partly fills the hollow owns no "source of supply but this foul stream and such casual addition as rare showers of rain may make, "falling on its area. The banks are composed of house filth and refuse of every kind, and a few yards "from the entrance of the drain there is the 'bathing ghât,' where daily a human crowd resort to "share with the maggots their sewage bath, and to rinse their mouths and cooking pots in concentrated "filth, and the margins of this pool and the adjoining land are covered with huts so closely set "together that single file passage can scarcely be had between them." These facts must be left to produce their own impression.

17. The Administration Report itself gives the details of sanitary works carried out in 1876. The "Conservancy" Department spent 15,510*l.* for scavengering streets and drains and removal of filth, maintenance of completed sewers, suppression of nuisances, cleansing of gully pits, street urinals, and latrines. Other work, such as tank filling, removal of trade refuse and carcases of animals, cleansing private drains, &c., is done by the Department and paid for by private persons. Public streets and lanes have been regularly swept every day, and about 235 tons of refuse are thus removed daily which would otherwise be visible enough; but, the Report says, "there still remain vast accumulations of it "lying about apparently unheeded in every bustee and even in many dwelling houses, and it is "nothing exceptional to find court-yards, recesses between walls and out-offices and outlying plots of "waste land, or even entire rooms of lower floors, permanently converted into store-rooms for refuse, "the compulsory removal of which must sooner or later be effected by the Corporation." The practical meaning of this statement appears to be that, whereas formerly Calcutta had no proper cleansing system, after 1864 such a system was organised, but its energies were spent on the public thoroughfares, where filth is more easily seen, and on account of better ventilation is least likely to prove injurious to the public health, while the most mischievous of all nuisances, those connected with private property, were left unheeded, and are so at the present time. If any exception can be made in matters of cleansing, surely the filth which happens to be in most immediate contact with human dwellings is what should be most persistently removed. So far as concerns public health it is evident there has been misdirection of effort; not that public streets should have been left uncleansed, but in the fact that the cleansing of public streets should have been considered the main end of conservancy. This matter is urgent, and is one of the first which should be taken in hand by the new authorities.

18. *Drainage.*—The state of the surface drains and trenches appears to be far from satisfactory. They can only be abolished when the drainage works proper have been completed, and it is satisfactory to know that wherever drain outlets were available these trenches have been filled up or reduced in size.

During the year, three-fourths of a mile of brick sewer and ten miles of pipe sewers were laid down. The state of the works was as follows:—

Total estimated cost	89 lacs.
„ expended	74 „
Brick sewers provided for	40·17 miles.
„ completed	39·21 „
Pipe sewers provided for	135·17 „
„ completed	47·34 „

There remain, therefore, of the main drainage scheme 0·96 miles of brick sewer and 87·83 miles of pipe sewer to be completed.

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During 1876 there were 2,503 premises connected with the sewers, making the total number of premises connected 7,214. Want of sufficient water is, however, a serious drawback to house drainage operations. Wherever the drainage has been completed the results appear to have been very satisfactory. The Report states that "drainage operations have now arrived at a stage at which there is "no dispute as to the necessity of completing them as quickly as possible. It is believed that by "proper effort this may be easily effected within three years. The numerous outbreaks of disease, "complaints of local unhealthiness and petitions for drainage from the most appreciative portion of the "inhabitants, and the very large increase in the house drainage connections, all point to the same "end." It is to be hoped that these facts will dispose once for all of the assertions frequently made that house drainage is not suited to Indian habits.

The approximate quantity of sewage pumped up and discharged into the outfall in 1876 was 631 millions of cubic feet, or about one and three-fourths times the amount of the water-supply, very little of which gets into the sewers. The discharged water appears to be chiefly subsoil drainage.

19. *Water-supply.*—Calcutta has two separate systems of water-supply by pipes. One for domestic use pumped up from the Pultah reach of the Hooghly river, and conveyed after filtration to Calcutta by a cast-iron pipe 42 inches in diameter, and 12¾ miles in length. There are the usual pumping engines and reservoirs, and the water is carried in pipes through 385 streets. The total piping measures 112½ miles, and there are 540 hydrants in the town. There is, besides, an unfiltered water-supply, pumped up from the river at Calcutta and carried by 26 miles of pipes to 978 hydrants, intended solely to supply water for road watering.

The Pultah works were originally intended to supply six millions of gallons of filtered water a day for 450,000 people. In 1870, during eight months of which the works were in operation, the demand a little exceeded three millions of gallons.

In 1871, the demand exceeded four millions of gallons; and in 1876, the demand exceeded the original supply by above half a million of gallons. In addition to the hydrants, there were 9,675 houses or premises in connection with the water mains, showing an addition of 705 over the preceding year. These facts, like those already cited about drainage, surely prove that the Native population of India is prepared for the introduction of pure water and improved means of distribution whenever they may be made available.

20. A very satisfactory feature in the Calcutta water-supply is that it maintains its purity, and that in this respect it exceeds in wholesomeness the water consumed by the population of London.

The following abstract shows the facts:—

	Contents in 100,000 Parts.							
	Total Impurity.	Organic Carbon.	Organic Nitrogen.	Ammonia.	Nitrogen as Nitrites and Nitrates.	Total combined Nitrogen.	Chlorine.	Hardness.
Calcutta, average of last nine months of the year.	15·79	·108	·036	·0001	·066	·102	1·053	4·64
London, Southwark Company, 1870 -	26·19	·160	·024	—	·260	·230	1·68	20·34
London, New River, 1870 - -	26·48	·087	·015	—	·247	·262	1·52	20·82

The Calcutta water was analysed on 155 days of the year 1876. The total ammonia in parts per million was 0·037, and of chlorine 10·65 parts per million. The filtration is apparently undergoing improvement. The present want is duplication of the filtered water-supply.

21. One of the most important sections of the municipal report is that which relates to bustee improvements, on account of apparent difficulties in their way, and of the absolute necessity nevertheless that this matter should be vigorously dealt with. What these bustees really are, and their influence on the health of the city, may easily be estimated from the facts already quoted from the Officer of Health's report. The officiating chairman to the Commissioners, while adopting Dr. Pilcher's description of them, says that "it is generally applicable to the interior of the various blocks into "which the city is divided. The city is intersected by several large thoroughfares which subdivide "the various wards into regular blocks of houses," among which the so-called bustees are situated. The improvement of these places having attracted the attention of the Corporation, the Government of India, and the Secretary of State, the problem which requires to be dealt with is stated as follows:—

"Given a large town covered with houses, erected without any semblance of order, teeming with "a dense population chiefly migratory, without latrines, and without any attempt at sweeping. All "the refuse, both of the house and cook room, is thrown into open ditches filled with putrefying "matter and a black greasy slime often several feet in depth. Generally in the centre of these blocks "there is a tank into which the sewage runs; on all sides there are privies which void their contents "into the water. * * * Every hour of the day the residents use this water for cooking purposes, "for washing and cleansing their utensils, their persons, and their soiled clothes, in close proximity to "the discharge of sewage from the latrines."

The chief difficulties in the way of effectual improvement are said to be that the proprietors of many of these bustees are poor, many are Hindoo widows who cannot sell or part with their property. Again, many of the bustees are intersected by public ditches or drains which cannot be filled up until drainage works properly so called are carried out.

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The first remedy, therefore, is thought to be to push forward the drainage and water-supply works, which are shown by the simple facts of the case already cited to be a fundamental condition of improvement along this line. But, when looked at by the light of experience in this country, the facts appear to show that, just as drainage and water-supply are not sufficient for the removal of all sanitary evils in London, neither are they sufficient in Calcutta. All over England town improvements, opening up new streets, abolishing unhealthy dwellings, and replacing them by new and improved ones, and providing open spaces for ventilation, are parts of all municipal procedure. And the question naturally arises as to whether the new municipality of Calcutta might not proceed in the same direction. So far as we can judge from the facts stated, a large part of the bustee property would not be worth either the trouble or expense of systematic draining and water-supply, and it is very doubtful whether if these improvements were carried out, the result would be worth the cost.

It may be suggested further that, bad as the villages are, the land on which they stand must be valuable in the midst of a large city, and that possibly the best way would be to consider whether this value might not be improved by carrying new lines of streets provided with suitable drainage and water-supply through many of them. It need scarcely be said that improvements of this class can be carried out without pecuniary loss to the poorest proprietor, and that this last condition would be one of the considerations to be taken into account by the municipality in its proceedings. Of course thorough local knowledge is necessary in dealing with such matters, and all that can be done is to suggest a course of proceeding which has been efficient so far in this country. But, on the sanitary question, the public interests demand that the duty of improvement should be fearlessly undertaken, and completed as quickly as possible. Until the work is done, the cholera tax alone will greatly outvalue any improvement rate that may be required.

The new Municipal Act gives powers of this class, but they are directed towards improvement rather than towards re-construction, and they can charge the cost to proprietors, or to municipal funds where proprietors are unable to pay. The suggestion made above is for re-construction, and for improved dwellings placed along new lines of streets or roads, in cases, of course, where mere improvement would be insufficient.

22. *Port of Calcutta.*—In a Memorandum in Vol. IX. of the India Office Sanitary Reports, 1876, the Commission called attention to some points connected with the new office of Health Officer for this port, and it is now proposed to notice a few points in the first year's report for 1876.

The number of European, American, and Eurasian sailors, and those of mixed blood, who visited the port in 1876 amounted to 25,448. The number of Asiatic sailors was 22,179; together, 47,627. The number of ships is not stated. The following table is of interest as showing the relative proportion of admissions to hospital from among European sailors during the year, but as the Europeans are not distinguished in the returns the figures only give the proportions due to each cause of admission:—

Diseases.	Admissions.
Cholera	110
Enteric fever	9
Malarious fever	244
Simple fever	32
Variola	None
Sunstroke	3
Scurvy	29
Dysentery	137
Diarrhœa	148
Liver disease	27
Venereal disease	133
All other diseases	966
Total	1,838

Some of the crews are said to have remained in port for three months and upwards, while a great number remained only about a fortnight.

The admission-rate cannot be deduced from the data, but, on the lowest supposition, it must have been above 2,000 per 1,000 strength per annum. The point is one of great importance, and should be accurately deduced for all classes of seamen in future years. The numbers admitted, and the classes of admissions, appear to show that sanitary improvement of the port is greatly required. Out of 110 Europeans admitted for cholera, 53 died.

The chief point of sanitary interest connected with cholera is that 46 admissions were from vessels *above* Fort Point, and 55 from vessels *below* Fort Point. The greater part of the shipping lies above the point, and hence the disease was most intense below the point, where "the sewage from Tolly's "Nullah and the Fort pours into the river, and, floating among the shipping below the Fort Point, is "used for washing purposes, &c."

Attention has been pointedly called to this fact by the Lieutenant Governor, "who is constrained "to observe that the action of the Suburban Municipality in respect to the sanitation of Tolly's "Nullah has displayed a great want of energy and persistence." "Several latrines discharge their "contents directly into the nullah (on the south side), the water is largely contaminated by stable "refuse, and the banks are continually defiled by the inhabitants of the neighbouring huts."

The Fort drainage is to be connected with the Calcutta outfall, and this nullah will no doubt be improved, especially as the Lieutenant Governor requests the Presidency Commissioner "not to rest "content with reports and explanations, but to see that effective steps are taken to remedy the evil "without delay."

During 1876 the municipal water was used by 18,980 men, on board 949 vessels, nearly four times the number of the preceding year.

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Among other duties performed by the Health Officer, "the sanitation of the river bank was actively "looked after," particularly about Hastings and Tolly's Nullah, the condition of which, especially its south bank, "is still very disgraceful."

In facts such as these, and in the unwholesome water-supply of past years, we can find adequate explanation of cholera among shipping at Calcutta. In many cases the river sewage no doubt has entered the bilges, and caused outbreaks of pestilence away at sea, with their necessary consequence, quarantine. The chief function of the Port Health Officer will be to deal with these and similar risks to health, as is fully recognised in the enlightened Government Resolution on the present Report, which says: "Quarantine rules which are vigorously enforced in the chief ports of Europe have not "been introduced here. Simple inspection by the Health Officer, and the adoption by the masters "of vessels of such hygienic measures as he may prescribe, stand in the place of quarantine regula- "tions, which frequently impose a heavy burden on commerce in European ports."

Besides sanitary supervision of the river, its banks and shipping, the Health Officer supplies notes on scurvy, food, lime-juice, &c., all important points regarding the health of seamen; but the amount of cholera, bowel diseases, and fevers shown in the preceding abstract proves how large a part ordinary sanitary inquiry and improvement must hold in his every-day duty. When the Port Health Officer has his work well in hand, the disease list of the port, as well as that on subsequent voyages, will fully justify the substitution of thorough sanitary procedure in port and on board ship for vexatious and useless quarantines.

23. In summing up the results of last year's Report of Calcutta Municipality, it may be admitted that the introduction of a new municipal system was likely to cause some delay, but now that the elective municipality is in operation, it is to be hoped that sanitary work will make greater progress. It is very satisfactory to be told that all parties are beginning to appreciate the advantages of drainage and filtered water, distributed in a wholesome manner, and that there is every desire to complete the works as speedily as possible, and, also, that so much has been done in surface cleaning. But the facts in these Reports show that the most urgent want is a complete cleansing of all the peopled part of the area of the city behind the public thoroughfares, and that to the absence of this is due, in all probability, a class of conditions which has been increasing in intensity while the drainage and water-supply works have been in progress. Filth, if unremoved, must necessarily accumulate, and it is quite possible that in this fact is to be sought the reason why, after cholera was apparently struck down by pure water, it raised its hydra head again by reason of increased filth. While the municipal engineers are pressing forwards with the drainage and water-supply works, it is a matter of vital importance that the conservancy branch should be able to cleanse effectually and keep clean the entire area, public and private, of the Native city. This, with filling up of so-called tanks with all possible speed by making use of the least objectionable kind of rubbish obtainable, draining and filling up ditches as the drainage works proceed, and extending water pipes and hydrants so that the people may have wholesome water within reasonable distance, will no doubt tell on the susceptibility to cholera. Home experience has told us that it is not always sufficient to provide pure water, for there are people who, from perverted taste, would rather use what is impure. Hence the necessity of abolishing all foul water holes even as possible sources of supply.

24. Our suggestion as to considering the re-construction of property in streets on the sites of bustees may be useful both in saving outlay on bad unremunerative property, and in effecting sanitary improvements not in other ways practicable. Experience obtained in Madras some years ago with re-constructed parcherries, and their effect on health, might be imitated possibly with advantage in Calcutta.

Lastly, the new appointment of Port Health Officer will apparently be a great advantage to the public service, but his first year's experience shows that he will have plenty of work to do, and he may be able to report perhaps more systematically in future years.

2nd March 1878.

Appendix by Sir J. Fayrer.

I can testify from long personal knowledge of Calcutta to the strict accuracy of Dr. Payne's description of the insanitary condition of that city. No description could exaggerate the abomination of open cesspools and drains lying between houses, and at the side of narrow gullies and streets; the foul tanks, latrines, and sewage contaminated water placed in the densest and most crowded part of the Native town, and resorted to by the people for washing, bathing, and even for drinking purposes.

The statistics, which at last are beginning to be reliable, confirm that which might be expected from such a state of things, that preventable disease is rife, and that the local only give too sure effect to the seasonal causes, whatever they may be, of cholera and other diseases.

It is very gratifying to know that real sanitary measures are in progress, and that they are under the direction of so able and energetic an officer. I would strengthen his hands in every way, and urge most strongly on the municipality the necessity of giving effect as much as possible to his recommendations. The foul water tanks within the city, not those in the squares or Maidan, should be filled up and converted into gardens or even building land.

The unfiltered river water should be prohibited for drinking or cooking as far as practicable. The open drains and cesspools should be entirely removed, and the sewage carried off into the underground drains.

The great system of underground drainage and the filtered river water-supply should be pushed forward, as no permanent improvement can be expected until they have replaced entirely the abominations so forcibly and accurately described in the Report. These measures completed, and a system of conservancy on a sound and reliable basis established, it is reasonable to anticipate a further great improvement in the health of Calcutta.

I can quite confirm all that Dr. Payne says on the subject of infant mortality, and the reasons for the great excess in Native as compared with European children. In the former the treatment of the

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mothers during and after the parturient period is alone sufficient, and when the other insanitary conditions are added, the wonder is that it is not greater than Dr. Payne represents it to be. This however can only be dealt with in part by the sanitary officer. Education and civilization we would hope may in time ameliorate the first-mentioned cause of mortality. European children born in India, up to six or eight years of age, thrive as well if not better than in England, simply because they escape the diseases so fatal to infant life in Europe and other cold countries. The instance of the European growing up to maturity and thriving cited by Dr. Payne from the European Female Orphan Asylum is quite true. The institution was under my care for 13 years, and the facts he refers to were recorded by me. I should be sorry, however, to deduce from that example more than the mere fact that they enjoyed good health.

I think it exceedingly fortunate that Calcutta has a new municipal system, and not less so that Dr. Payne is the sanitary adviser.

27th January 1878.

No. 11.

Memorandum of the Army Sanitary Commission on the Report of the Madras Municipality for 1876–77.

1. The year included in this Report was one of great anxiety and trouble to the local authorities in Madras on account of the famine, and not much in the way of effective sanitary progress was to be expected. The vast influx of starving people, and the dread of pestilence coming with famine, gave another direction to sanitary work, and, except in the usual departmental details, the principal part of the Report is devoted to an account of the events of this period and the temporary measures adopted for saving life.

2. The following statistical facts will show the nature and extent of disturbing causes introduced by the famine.

The last census of the city of Madras gave the population in this abstract:—

	Numbers.
Europeans	3,613
Hindus	309,521
Eurasians	12,013
Native Christians	21,441
Mahomedans	50,964
Total	397,552

These figures may be taken as representing the population elements before the famine began.

Long before October 1876 there had been scarcity of food, but in that month it was severely felt, and a number of "feeding houses" were opened for the relief of starving poor. It is believed that above 12,000 persons were relieved at these houses, besides a very large number who received relief from private persons.

One effect of this charity was that it drew a vast number of destitute persons to the city; every available space and shelter was occupied by crowds of people, and "at least 200,000 utterly destitute "persons must have come into Madras at this period," that is, between October 1876 and January 1877. Prompt steps were taken by the Madras Government to provide against this distress, and by the end of December 7,473 non-residents were receiving one meal daily, and 8,757 were housed and fed.

The Municipal Commission provided food and employment for large numbers at Sathangad and Madras, and reports of the Commissioner of Police show the following average daily number of persons to have been gratuitously fed at the Government relief camps :—

	Resident in Camps.	Non-resident.
1876.		
December	5,149	4,829
1877.		
January	11,789	9,186
February	11,737	8,138
March	10,301	11,350

But in addition to these numbers vast crowds of hungry people obtained some subsistence by the scatterings or pilferings from rice bags, of which it is calculated that 20 tons were disposed of in this way during these four months.

3. The influx of so large a number of people, many of whom located themselves in the streets, rendered a considerable increase in the conservancy department necessary, and there were added to it—

8 overseers.
36 peons.
43 carts, with bullocks and drivers.
138 scavengers.

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A special health department was organized, and 16 junior Medical Officers were stationed in different districts, with a suitable staff of servants, medicines, and appliances for making house to house visitations.

4. Under the conditions stated it is, of course, impossible to assign statistically the influence of deaths among the famine population on the city mortality. But the following abstracts give the details as far as practicable :—

	Total Deaths.		
	1876–77.	1875–76.	Increase in 1876–77.
I. General diseases	12,700	5,244	7,456
II. Local	9,745	7,026	2,719
III. Conditions	2,192	1,976	216
IV. Poisons	8	4	4
Injuries and operations	355	165	190
Total	25,000	14,415	10,585

The deaths due to the famine population exceeded those due to the resident population by somewhere about 10,585.

By calculating the total deaths as rateable upon the different classes of population already given, the following results are arrived at:—

	Ratios per 1,000.		
	1876–77.	1875–76.	Increase in 1876–77.
Europeans	37·	33·4	3·6
Hindus	65·9	34·9	31·
Eurasians	41·	36·	5·1
Native Christians	47·3	36·5	10·8
Mahomedans	58·1	44·5	13·6
Total	62·8	36·2	26·6

It would appear from these data that from the deaths registered among known classes of the population there was an augmentation of the mortality among all classes, and that the result of the famine was to raise the death-rate of Madras over the entire resident population (including, of course, deaths among non-residents) to the extent of 26·6 per 1,000.

5. The influence of the famine conditions on the total zymotic mortality is clearly shown as follows :—

	Total Deaths.		
	Eight non-famine Months, April to November 1876.	Four famine Months, December 1876 to March 1877.	The whole Year.
Small-pox	256	2,900	3,156
Fevers	1,475	1,512	2,987
Dysentery	810	1,524	2,334
Diarrhœa	536	1,642	2,178
Cholera	1,119	3,896	5,015
Total	4,196	11,474	15,670

Calculated as annual ratios, these figures give roughly the following results, which are in some points not altogether in accordance with other famine experience. Small-pox mortality was augmented twenty-fold. Fever mortality was doubled. The deaths from dysentery were increased fourfold, and those from diarrhœa sixfold.

Cholera deaths were increased seven-fold. Fevers of various types are the usual concomitants of famines, but in this instance, while the fever rates were doubled, the deaths from bowel diseases, cholera, dysentery, and diarrhœa were augmented sixfold.

The following abstract of a table in the Report gives a comparison between the months of scarcity and famine of 1876-77 and the same months for a period of 10 years:—

	Average Death-rates per 1,000, 10 years.	Death-rates per 1,000, 1876–77.
Eight months of scarcity	33	36·8
Four months of famine	34·2	114·9

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The increase in 1876–77 was thus 3·8 per 1,000 for the scarcity months, and 80·7 for the famine months.

The only direct information as to deaths among actual recipients of relief relates to three out of the five relief camps, in which the deaths up to the end of March 1877 were—

Men - - - - -	576
Women - - - -	417
Children - - - -	489
Total - -	1,482

But there are no means of estimating the corresponding population.

6. The death-rates in most of the Madras town districts were excessive, although at all times many of the rates are high. A list of villages is given in which the average death-rates are stated at 62·8 per 1,000; and there were, nevertheless, eight villages in which the rates exceeded this figure in 1876–77. Of these, Perambore had a death-rate of 10 per cent., Meersaibpett of 10¼ per cent., and Rozapooram of 11¼ per cent. Of this last rate 8¼ per cent. took place from zymotic diseases.

The poorer districts were the most likely to have been overcrowded. The reporter considers that at the end of January the increase of population was no less than 50 per cent. of the local population. It is not surprising, then, that under the influence of crowding, starvation, and the usually low sanitary condition of the Madras population, there should have been a great increase of mortality. And experience shows that in any similar calamity the great principle to be kept in view is to provide, as far as practicable, for the suffering people in camps quite away from the towns.

7. *Water-supply.*—Like other things, the water-supply of Madras underwent deterioration both in amount and quality from diminished rainfall, preceding and during the famine. In March 1877 the amount obtained from the Red Hill supply was scarcely two gallons per head per diem of the fixed population. The quality likewise became deteriorated by loss from evaporation and low water level in the reservoir. The solids were increased and also the amount of chlorine. In consequence of the prospective failure of the Red Hill water, steps were taken to cleanse the town wells, of which 472 were repaired and cleaned out, and 22 new wells were constructed. Very little was done in extending the service piping during the year.

8. *Drainage.*—The Madras water-supply will doubtless receive attention, together with the drainage works yet to be begun.

The Report states that most of the street drains require repair; in fact, Madras requires to be sewered and drained, and until this great work is completed the numerous causes of nuisance and ill-health indicated in the Report as connected with the present system of disposing of domestic refuse will continue as they are. The amount spent on conservancy in Madras was, in 1875, 18,800*l.*, or 32 per cent. of the income, a large part of which would cease to be required if the city were effectively sewered and drained. The only point of interest in the drainage question is that about 16½ acres of ground are under sewage irrigation, but in the present state of the works no profit can be looked for. The farms are in reality only a means of disposing of a certain amount of sewage without injury to health, and as such the outlay is advantageous. But to work the farms with a profit the town must be sewered and drained, and the farms worked with the least outlay for preparation and attendance.

9. Sewage farming, like other sanitary matters, has not made much progress of late years in Madras, if indeed it has not retrograded, as has been apparently the case with the parcherries, in which some striking improvements were made some years ago. It is, however, stated in the Report that "every "endeavour is being made to improve their condition by drainage and by improving the ventilation, "by removing some of the huts and opening new streets through them," and yet "they are the "hotbeds of disease." This last sentence does not argue much in favour of results, whereas the former improvements referred to were attended by reduced death-rates. Probably the true economic solution of the difficulty lies in the fact stated, that many of the parcherries are situated on valuable building sites, and hence improvements might be made to pay for themselves.

In conclusion, the chief interest of the present Report centres in the effect of the famine on the sanitary state of Madras. And the other sanitary matters noticed in the Report all point in one direction, namely, the effective sewering and drainage of the city, the extension of the water-supply, and subsequent supervision.

28th June 1878.

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No. 12.

MEMORANDUM of the ARMY SANITARY COMMISSION on the REPORT of the BOMBAY MUNICIPALITY for 1876.

1. The sanitary statistics prepared by the Officer of Health for 1876 are based on the census of 1872, which gave the population of Bombay at 644,405.

The total deaths in 1876 were 20,783, equal to a death-rate of 32·25 per 1,000.

Arranged according to death causes the proportions were as follows:—

Causes of Death.	Total Deaths.	Ratios per 1,000 of the Population.
Small-pox	3,174	4·92
Measles	43	·07
Fevers	5,867	9·10
Cholera	378	·59
Phthisis	2,804	4·35
Nervous diseases	1,957	3·04
Respiratory diseases	1,496	2·32
Diarrhœa	815	1·26
Dysentery	1,164	1·81
Accidents	262	·41
All others except still-born	2,823	4·38

The deaths according to sex were:—

Males	10,825
Females	9,958
Total	20,783

or in the ratio of 108·7 male deaths to every 100 females.

2. The birth registration is still in a very imperfect state, as may be seen by the following results for 1876:—

Births registered	Males	7,020
	Females	6,605
Total		13,625

Were these numbers correct they would show that in Bombay the population had been diminished by excess of deaths over births to the extent of:—

Males	3,805
Females	3,353
Total	7,158

Improvement in the registration of births would restore the balance.

No less than 48 per cent. of the children under five years of age died, and about 54 per cent. of those under one year.

The chief death cause among children is said to be fever, from which 2,575 children died in 1876, but this mortality was exceeded by that from small-pox, which prevailed as an epidemic and occasioned 2,666 deaths during the year.

The total deaths among children under five years amounted to 9,981.

3. A table, showing the manner of disposing of the dead, gives the following information:—

Buried	15,527
Burnt	5,255
Exposed to carrion birds	1,137
Total	21,919

This includes still-born.

4. The total mortality during 1876 was very unequally distributed over the city, as is shown by the population and death-rates in 31 localities given in Appendix C, and abstracted in a table which follows.

The lowest death-rate, 1·91 per 1,000, took place among a population of 22,953 in the water division, which it is presumed, from the name, includes the shipping.

The deaths, three in number, out of a population of 4,841 in Middle Colaba are evidently exceptional.

The other town districts showed death-rates varying from 4·23 per 1,000 at the Southern Fort, and 16·42 per 1,000 in Upper Colaba, to 47·83 per 1,000 at Kamateepoora with a population of 46,996.

All the districts or localities, with the exceptions stated, have their death-rates at and above 22 per 1,000. There are nine with death-rates between this and 30 per 1,000.

Of 16 divisions the death-rates lie between 30 and 40 per 1,000, and in two divisions the rate exceeds 40 per 1,000. These death-rates may be safely assumed as showing the relative sanitary requirements of each district.

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5. It has been already shown that the average death-rate from fever in Bombay was 9·10 per 1,000 in 1876. All the divisions, except Southern Fort, had fever deaths, but the ratios to population varied greatly. The water division, with its large population, had only 16 fever deaths, or 0·70 per 1,000.

The lowest town division rate was 3·58 in Upper Colaba. Above this the rates were, in round numbers, 4, 7, 9, 10, 11, 12, per 1,000. The highest rates were 16·35 per 1,000 in Mandwee division, and 17·49 per 1,000 in Seoree.

6. The total cholera death-rate for Bombay was 0·59 per 1,000. In some divisions the death-rate was scarcely definable, statistically, for practical purposes. The highest ratio was 4·63 per 1,000 in Mahaluxmee division.

The cholera deaths were less than an eighth part the number of deaths from small-pox, and less than a fifteenth part of the deaths from fevers. This pestilence occupied a very secondary place of importance in 1876.

7. Arranged according to divisions the small-pox mortality did not exhibit the same extreme rates as the general mortality, or as fevers. The ratios were from about 2 to 5 and 6½ per 1,000. There was only one division, that of Kamateepoora, in which the small-pox death-rate reached 8¼ per 1,000, out of a resident population of 46,996.

These are the chief statistical facts of the year bearing on sanitary work.

8. The Officer of Health has collected information on local causes connected with the mortality which enables those causes, as they exist in Bombay, to be submitted to analysis for practical purposes as follows:

Bombay has long had a water-supply requiring extension and improved means of distribution. The city has been under an active conservancy administration. There is as yet no proper system of drainage, and the population is considerably crowded in some of the divisions. Is it possible to form any practical estimate of the probable influence of these conditions on the public health?

It will next be shown what evidence there is of such an influence being exerted from the data in Mr. Weir's report, premising, however, that the health of any given population is the result of all the conditions to which it may be at the time exposed.

9. *Influence of surface crowding.*—The following table, abstracted from the Officer of Health's Report, will show the relation between the surface area in each division of Bombay and the more important death-rates:—

	Mean Area per Head in Square Yards.	Death Rates per 1,000 of the Population.					
		Small-pox.	Cholera.	Fever.	Phthisis.	Diarrhœa and Dysentery.	All Causes.
Chuckla	6·34	4·95	·08	11·23	6·20	1·59	31·32
Koombharwada	7·63	4·60	·44	10·91	5·36	3·81	36·60
Oomburkharee	8·31	6·67	·12	11·95	7·47	2·71	38·81
Kara Talao	8·40	5·50	·13	11·29	8·29	5·24	46·78
Market	9·44	4·51	·30	9·81	4·54	1·53	27·33
Bhooleshwur	9·65	4·52	·19	12·05	6·63	2·22	31·11
Mandvie	10·82	4·96	·34	16·35	5·38	2·56	38·34
Dhobee Talao	10·93	5·27	·71	8·15	3·09	2·82	30·41
Dongree	12·85	6·34	·39	9·15	4·03	3·99	36·97
Northern Fort	15·11	5·75	·37	6·86	2·35	1·22	26·40
Funuswady	18·27	4·09	·53	7·32	2·55	1·02	21·77
Khetwady	22·29	5·00	·52	7·49	3·18	4·13	33·84
Girgaum	23·24	4·99	1·55	10·03	4·38	2·21	31·78
Kamateepoora	42·78	8·25	·19	9·40	7·53	5·71	47·88
Chaopatee	54·57	1·99	3·72	9·55	3·05	3·72	31·33
Mazagon	61·72	5·24	·71	4·53	2·05	2·62	24·69
Upper Colaba	69·46	·30	—	3·58	2·39	1·79	16·42
Lower Colaba	69·46	6·54	2·14	9·03	4·16	1·90	32·33
Tarwaree	126·32	3·57	·10	4·16	2·18	2·68	22·81
Esplanade	230·58	2·29	·19	7·07	1·63	2·58	26·47
Walkeshwar	342·51	2·71	·77	6·46	3·49	2·32	27·25
Parell	496·47	4·86	·65	9·44	2·69	4·00	33·32
Worlee	603·56	5·38	1·39	9·46	1·79	4·08	31·06
Seoree	608·05	2·24	1·57	17·49	1·12	2·24	31·83
Mahaluxmee	623·94	2·08	4·63	6·72	2·78	2·08	28·02
Seo	1,278·98	2·42	2·25	5·96	·69	4·92	27·30

The influence of surface crowding on mortality can only be arrived at if all other conditions are equal within the compared areas. This requirement can seldom be predicated except in the case of buildings, and hence the comparisons in regard to districts are only general. This is an old subject of discussion in England, but the data in the preceding tabular abstract are the first, so far as we know, which have been given for an Indian population, and although the most crowded areas in Bombay are by no means so crowded as some areas in British towns, still the figures, taken as a whole, show that surface crowding influences death-rates in India as it does at home.

There are exceptionally high rates in Kara Talao and Kamateepoora divisions, due apparently to special local outbreaks of disease; but making allowances for these, the death-rates in areas with less than 20 square yards per head are as 33 to 29 in districts where the surface area exceeds this amount.

An important result of the table is that cholera mortality was not influenced in 1876 by mere surface crowding. The same may be said of diarrhœa and dysentery. On the contrary, phthisis was evidently influenced by crowding, and was one cause of the higher death-rates in crowded districts. With few exceptions the fever death-rates were all highest in the same districts.

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It may be useful to place on record a result of similar comparisons made in regard to entire populous towns in England about 35 years ago by the late Sir John Forbes :—

Towns.	Ratio of Density of Population.	Deaths in the whole Population annually.	
		Phthisis.	Fever.
Birmingham - - -	40	1 in 207	1 in 917
Leeds (Borough) - -	87	1 in 209	1 in 849
Metropolis - - -	50	1 in 246	1 in 609
Manchester - - -	100	1 in 172	1 in 498
Liverpool (Parish) - -	138	1 in 166	1 in 407

10. The element of crowding includes the result not only of small cubic space and bad ventilation in sleeping rooms, and consequent predisposition to pulmonary diseases, but also the production of a larger amount of putrescible human and animal refuse on a small area, which must be removed at once, or if left in the locality it will produce diseases of the febrile type and so increase the fever mortality. But the fever death-rate in Bombay appears to be to a great extent connected with other causes besides filth, as may be seen from the following classification given by Mr. Weir :—

	Fever Deaths in 1876.
Enteric fever - - - - -	65
Simple continued - - - -	117
Ague - - - - -	170
Remittent fever - - - -	5,515
Total - -	5,867

It will be seen that all the fever deaths except 182 were due to the paroxysmal classes, indicating clearly the presence of other causes than filth.

If the whole surface of Bombay is equally cleansed, drained, and ventilated, the results of over-crowding would appear to be increased general mortality and increased death-rates from small-pox, consumption, and fevers. But the Report shows that much requires to be done before this result can be arrived at, and we must in the meantime for practical purposes make use of the facts as pointing out clearly where sanitary impruvements are most needed.

11. *Influence of Vehar water on health.*—The source from which Bombay obtains its water-supply appears to be unexceptionable, nevertheless complaints of its sensible qualities have frequently been made. Even so late as 1875 Mr. Weir says : "The water not unfrequently exhaled a dead leaf odour, "and it had what, for want of a better name, I call a metallic taste." The great reservoir which collects and stores the rainfall contains a large amount of vegetable life. The water is strained before entering the pipes, but it is not filtered, and the distributing arrangements are described as follows by the Officer of Health :—"Not to speak of water mains running through sewers, service pipes in most "parts of the city may be found lying in sweepers' gulleys and washed by sewage. In some sections, "as in Nowrojee Hill, a water pipe may be found in almost every passage for house sewage and "sullage ; and in Byculla there is a six-inch main lying at the bottom of an open drain which is con-"stantly filled with sewage. In twelve sub-sections of No. 2 and in eight of No. 3 ward there are "service pipes laid in drains or passages for house drainage ;" and he adds very properly that "the "laying of water pipes in drains, sewers, or passages for house sewage and sullage was a sanitary "crime and inexcusable." With an intermittent supply, such as exists at present, the health of Bombay may be said to depend on the tightness of water-pipe joints, and on the absence of cracks or holes in the pipes. It is in this way that culpable ignorance may spread pestilence over a city. Perhaps the simplest way of dealing with this dangerous state of the water-supply would be to divert all the sewers and drains and fill up the trenches with clean earth. No time should be lost in the work. Other facts stated by Mr. Weir go to show that the distribution arrangements are generally defective.

If more attention were paid to the gathering ground of the Vehar lake, if the water were filtered, and distributing arrangements improved and protected from influx of sewage and foul subsoil water, Bombay would have the advantage of water of excellent quality.

12. The following facts ought to afford a lesson to those who, in such inquiries, may be disposed to lay hold of one disease cause and overlook the influence of others of even greater importance to health.

The usual amount of albumenoid ammonia in Vehar water is from ·12 to ·15 per million. But in August 1876 the amount of albumenoid ammonia fell to ·08 per million with a large increase of mortality from bowel diseases. The explanation is that 12 inches of rain had fallen and increased the purity of the water-supply, but "all the low-lying divisions of the city were completely sub-"merged, and some portions of the island were reduced to a swamp." Of the poor people few have beds to sleep on, and "chilled by the damp their health readily fell a prey to the noisome vapours "from the swampy ground."

13. The most important of all sanitary questions regarding water is not so much its chemical composition as its source, on the well known sanitary principle that no source should be adopted, whatever analysis of present samples may disclose, to which sewage of men or animals can find access, From this danger Vehar lake appears to be exempt. Not so, however, the well water of Bombay.

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derived in many cases as it appears to be from foul subsoil drainage. Many persons using well water were attacked and died of cholera; but many died who used Vehar water. In illustration of this fact Mr. Weir gives the following useful comparison, showing the fatality of cholera in each class of cases in 1876:—

——	Attacked.	Died.	Per-centage of Deaths.
Vehar water drinkers -	375	261	69·6
Well water drinkers - -	168	117	69·6

This clearly shows that the death-rates were the same in both classes of attacks. But the actual results of using either water could only be obtained by showing the per-centages of attacks and deaths for the *total population* using each class of waters.

If we suppose that Vehar water was used in the condition in which it was drawn from the pipes, and without added impurity, there is the patent fact that, out of a total mortality from cholera of 378 in 1876, no fewer than 261 deaths, or nearly 70 per cent. of the mortality, took place among people using a comparatively pure water.

14. As this subject is of considerable importance for practical purposes, it may be useful to subjoin samples of analyses of Vehar water, and also of well water, used by persons who died of cholera.

Vehar water.—The total solids in Vehar water were from 4·16 to 7·5 grains per gallon. This proportion is the usual one. Cholera was most fatal in July, August, and September, and 327 out of 378 deaths took place in these months.

The following tests of the amount of organic compounds in this water are taken from analyses made during this period:—

——	Grains per Gallon.	Parts per Million.	
	Chlorine.	Free Ammonia.	Albumenoid Ammonia.
July 18th - - -	·7	trace	·20
August 23rd - -	—	·005	·08
September 9th - -	—	trace	·08

The almost total absence of chlorine, together with the exceedingly small amount of nitrogenous compounds, shows that the latter were of vegetable origin, and that the use of Vehar water as drawn from the pipes which supplied the samples could in no way account for the cholera deaths.

Well waters.—The following well waters were used by people who suffered from cholera; the dates of analyses are also given:—

——	Grains per Gallon.		Parts per Million.	
	Total Solids.	Chlorine.	Free Ammonia.	Albumenoid Ammonia,
January 8th - - -	42·	4·8	·08	·19
July 17th - - -	71·4	16·	·19	·24
" " - - -	63·7	12·7	·18	·16
August 20th - -	73·	10·6	·02	·02

The great differences between these samples and the Vehar pipe water are of course the nine or ten-fold amount of total solids, and the great amount of chlorine, part of which, however, might be due to the subsoil, but any way there is enough of it to show that the nitrogenous matter was in this case of animal origin, and possibly in a state of putrescence.

The deduction from these striking facts is *not* that impure water has no influence on cholera mortality, for this fact has been proved more than a quarter of a century ago, but the very obvious conclusion which follows from them is that the purest water, by itself, cannot be relied on as a protection from cholera, and hence that there must have been some other agency at work besides impure water in causing nearly 70 per cent. of the cholera deaths in Bombay in 1876.

15. Allusion has already been made to the possibility of impurities being added to the Vehar water before it was used by the people. This referred to a most injudicious method of distribution which had been adopted, apparently to save water, namely, the introduction of "dipping wells," for it is evident that, however pure the Vehar water may be on its entrance to the well, it would be exposed to the risk of sewage infiltration, and to filth from unclean dipping vessels, besides atmospheric impurities. There is no fact in the Report connecting cholera cases with this method of supply, but the following analyses of samples of Vehar water derived from dipping wells will show the chemical facts:—

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	Grains per Gallon.		Parts per Million.	
	Total Solids.	Chlorine.	Free Ammonia.	Albumenoid Ammonia.
February 9th	4·9	1·5	·11	·26
July 7th	—	2·9	·12	·14
September 9th	—	—	·73	·14
November 25th	—	·8	·08	·11
Water filtering into dipping well, August 9th	—	—	·24	·05

On comparing these results with the analyses of Vehar water itself as drawn from the supply pipes, it becomes at once evident that the amount of chlorine is greatly increased, and also the amount of ammoniacal products, leaving little doubt that the latter are of animal origin, and derived from foul subsoils. Whether the cholera deaths among Vehar water drinkers were due to these wells specially, there are no data in the Report to show, but the facts condemn the whole "dipping well" arrangement, and show that it should be given up without delay. We concur entirely with the views of the Officer of Health in this matter, and it is satisfactory to be told that a beginning has been made in filling up these wells and substituting covered cisterns for them; but if Bombay had a constant water-supply it would be safer to use hydrants, which are now constructed to prevent waste of water.

16. Before concluding these remarks on the connection of water with cholera, attention must again be called to risk to health of the present method of supplying ships with water in an atmosphere polluted by the discharge of night-soil and sewer contents into the harbour.

The Officer of Health shows that, without the continual exercise of an amount of care never likely to be bestowed on the matter, the water boatmen may draw Vehar water with a trace of free ammonia, and ·085 parts per million of albumenoid ammonia, and deliver it with ·17 parts of free ammonia and ·18 parts of albumenoid ammonia per million, the whole increase being derived from absorption of air contaminated with sewer exhalations. A grave mistake in disposing of sewage at Bombay might hence be the cause of outbreaks of cholera on board ship hundreds of miles away.

17. *Effect of conservancy on the death-rates.*—Mr. Weir gives the following account of the work of this department:—"In no city have more determined efforts been made to remove by hand the refuse of "the population than in Bombay. The surface of the city is scraped and brushed to a degree "probably unknown in any other city in India, and the removal of the dry garbage may be said to "be complete. Have the efforts made to remove the other refuse matters been as successful? I fear "it is impossible to say they have been equally successful. The difficulties in removing by hand any "great portion of the excremental products are immense, and the removal of any considerable amount "of fluid refuse would impoverish the most prosperous city."

Although in Bombay the removal of the night-soil by hand has been successful to a degree unknown anywhere else in the world, "but an inconsiderable portion of the total solid and fluid excrementitious "matters has ever been collected and removed by hand and carts." This, then, is the practical result of all the labour and cost involved in the Bombay conservancy system.

In 1876 there were employed in the halalcore branch—

1 European Superintendent,
51 Native ditto,
86 carts,
1,038 halalcores,

at a cost to the ratepayers of 21,685*l.*

What, then, becomes of the unremoved solid and fluid excrementitious matter of the population? It sinks into the subsoil, or evaporates into the air, and as all the evils of this class are worst in the densest districts of towns, have we not in these facts an explanation of one of the relations at least between density of population and death-rates, and have we not in the generally undrained subsoil and its malarious characteristics, taken in connection with the animal impurities which pollute it, a prominent cause of the fatal fever types in Bombay?

18. No progress appears to have been made with any systematic general scheme of drainage. The old unhealthy so-called drains exist as they were.

It was necessary to break up streets and to open and cleanse 175 miles of covered drains in the year 1876, at an outlay of 7,317*l.* The reason of increased activity in this matter is stated by the Officer of Health to have been the "prevalence of zymotic diseases," and in dealing with these foul drain nuisances he very properly lays down this fundamental sanitary principle, that "it is but a waste of time"—and we may add, of the ratepayers' money—"to try to smother any smell by throwing dis-"infectants over the place whence it issues. It is quite clear that there is something wrong which "is causing the smells, and which should be removed;" and he has insisted on the cause of the smell being traced out and the mischief remedied. Now that this important principle, which we have all along insisted on, has returned to this country in a practical form from India, it is hoped that less will be heard in future of substituting costly chemical compounds for cleansing and draining.

The further reform wanted for Bombay is making drain cleansing and halalcore work unnecessary by providing a proper system of self-cleansing drains and sewers, and the facts already stated go to prove that it is in this direction that we must look for more efficient removal of local disease causes.

In the absence of a proper system of drainage and sewerage to remove the sewage of the population and to keep down the subsoil water level, it is to be feared that no practicable amount of mere hand removal of excreta from among so large a population will materially improve the present state of the public health, and no available funds would be sufficient for the constant breaking up of streets and cleansing of drains which would be necessary to keep down drain nuisances.

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In spite of any efforts in these directions, no material change could be effected in the foul damp ground underlying the dwellings of a large part of the population, and another year's experience has shown how urgent a matter it is that the Municipality should drain the city.

We can only repeat what has been so frequently said on this subject, and at the same time call attention to the great annual outlay incurred for halalcore work and drain cleaning which, if capitalized, would go a considerable way to pay for proper drains and sewers.

19. *Causes of small-pox mortality.*—As already stated, there were 3,174 small-pox deaths in 1876, or nearly 5 per 1,000 of the population. As this epidemic excited considerable attention at the time, it may not be out of place for future purposes to put the following facts regarding it on record.

The small-pox mortality of 1875 was represented by 248 registered deaths, an unusually small number of which took place towards the end of the year. The epidemic suddenly burst out in January 1876, and presented the following monthly mortality :—

	Deaths.		Deaths.
January	200	July	27
February	646	August	11
March	1,216	September	5
April	654	October	5
May	298	November	2
June	92	December	16

These figures show that the chief mortality took place in the cold season, affording in this fact a remarkable contrast to the course of this disease in other parts of India, where the maximum small-pox mortality usually takes place in the hot season. A probable reason assigned by the Officer of Health for the prevalence of small-pox in Bombay in the cold months is that "the people keep inside and "sleep inside their houses, all the doors and windows are kept carefully closed, and as much of the "cold wind as can possibly be kept out is excluded." The rooms at night are overcrowded.

There can be little doubt that, given these conditions, small-pox is very likely to be aggravated by them, but they cannot apply to parts of India where the disease is most prevalent during the hot season. The best way to arrive at the influence of crowding and want of ventilation would be to obtain the number of cases per house where these conditions were known to have existed.

20. There are no means of knowing the relation between vaccination and the amount of small-pox among the population, because the number of vaccinated and unvaccinated is not known. But the following data show the numbers vaccinated and unvaccinated among the persons attacked.

In all 6,712 cases of small-pox came to the knowledge of the health department. Of these 5,144 were unvaccinated, and 1,568 were vaccinated. Out of 108 cases carefully examined 13·8 per cent. died. Of vaccinated cases 8·3 per cent., and of unvaccinated cases 16·9 per cent., died.

The most important sanitary agency employed to cope with this outbreak was vaccination. "Morn- "ing and evening a vaccinator with a heifer had been sent round the streets, so that vaccination was "brought to the very doors of the people." The vaccination department was strengthened, and the inspectors entered houses where small-pox had appeared. Advertisements were also inserted in the daily papers and posted up. The house to house visitation "had a most happy effect, and an immense "number of applications for vaccination were received." The practical result was that 17,922 persons were successfully vaccinated, and 11,734 successfully re-vaccinated during the year ; but it must be added that these together were less than a twentieth part of the population.

There is enough room yet for the spread of vaccination.

21. *Sanitary improvements.*—Although it is necessary to call pointed attention to sanitary defects which require permanent works for their removal, still much useful detail procedure was adopted during the year. Cleanliness was rigidly enforced, "the houses of the poor were lime-washed and cleaned "for nothing, notices were served on those who could afford to do so," and in certain cases bedding and clothing were destroyed. The work of improving the flats has been proceeded with, and some steps appear to have been taken towards improving the water distribution.

The great want is the execution of the drainage works. The present report for 1876 shows that little more can be done by mere fetching and carrying to improve the sanitary condition of the city.

And we conclude these remarks with a strong recommendation that every house in Bombay should have facilities placed at the disposal of the inhabitants for the removal of house slops and sewage in properly constructed drains and sewers away altogether from the subsoil. The evils of the existing system have been fully pointed out in the present and former reports of the able and zealous Officers of Health of the municipality, and the remedies have been fully discussed and have been long known.

The water-supply of Bombay will soon be greatly increased, and, practically, the drainage water of the Vehar and Toolsi valleys will ere long be poured into the city without any step having been taken to remove all this water after it has been fouled by domestic use.

The complement of water-supply is drainage, without which it may become a potent agent in lowering the public health. The municipality ought not to lose a day in completing the other half of their work, by which the subsoil will be dried and protected from filth, the houses drained, and the annual outlay of 29,000*l.*, spent in breaking up roads, cleaning drains, which, if properly constructed, never would require hand cleansing, and doing by hand labour of halalcores what ought to be done by the law of gravitation, would be saved, or, at all events, spent to better purpose.

22. As it is understood that the drainage and sewerage of Bombay are at present under consideration, the Commission would suggest that attention be directed to the following practical points which have been brought before them by Mr. Rawlinson :—

"In providing sewers and drains for India, the following points should be duly considered. During "the dry and hot period of the year evaporation and absorption will be rapid, and if the drains are "near the surface and porous, and the subsoil is dry, porous, and cracked, all the fluids passed to the "drains will soak and evaporate away, leaving any solids to accumulate and harden in the drains, so "as to become immoveable by water flushing. Drains of the rude character indicated in this Bombay

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" report, and worked under the supposed conditions, must choke, and must then be broken open to " be cleansed. A badly formed, shallow, and leaking sewer would accumulate deposit in the climate " of England, where the temperature is moderate and the rain much more frequent.

" Sewers and drains in India should be absolutely water-tight; they should be circular or egg-" shaped in form, have smooth interiors, be laid in right lines from point to point, with manholes at " any change of line or gradient. They should be absolutely true in line and in gradient, and the " cross-sectional dimensions should diminish from the outlet sewer up to the smallest branches, and " every inlet should be of less diameter than the drain or sewer, so that any substance which could " enter the drain should be capable of being passed through it.

" Every drain should, at its head or highest point, be connected with a flushing tank, where a body " of water can be liberated which shall dilute and sweep down any accumulated sediment before it " has hardened into an immoveable concrete. If, however, the drains are water-tight, and are only " used to remove waste water and human excreta, the contents of every drain will at all times be in " a fluid state, and will bear to the outlet all that true town sewage contains.

" Sewers and drains are not to be made the receivers of solid garbage; this must be removed by the " scavenger.

" Sewers and drains should be of capacity when half full sufficient to remove the maximum volume " of sewage in eight hours, excluding surface water; this must flow over the surface as at present, or " have special conduits provided for special surface flood purposes, independent of the true sewers and " drains.

" The grade or fall of a sewer or drain is not of so much consequence as are the proportions of the " sewers and drains in section, and the absolute truth of workmanship longitudinally. A sewer line " in form, and having an even and smooth inner-skin surface, may be level, and by occasional flushing " may be preserved clean.

" Where it is practicable, the grade of a sewer should be such as to give a flow half full of not less " than two feet per second, and not greater than six feet per second, as betwixt these velocities sewers " will work without flushing and without injury. A quick scouring velocity is liable to injure the " sewer by disintegration and the cutting power of road grit carried along the invert.

" Sewers and drains having flat gradients may require flushing at intervals.

" Sewers and drains having steep gradients may require to be ramped, or broken into lengths having " vertical falls."

1st April 1878.

No. 13.

Memorandum of the Army Sanitary Commission on the Health Returns of British Troops in Madras for 1876.

1. The average strength of British troops in Madras Presidency in 1876 was 11,132. Admissions to hospital were 12,224 = 1,098 per 1,000 strength. The death-rate, deduced from 157 deaths in hospital and 17 out of hospital, 174 in all, was 15·63 per 1,000.

There were 356 men invalided for change and 122 for discharge, together yielding an invaliding rate of 42·94 per 1,000 strength.

The total loss of the Madras Army for the year was thus 58·57 per 1,000; but it must be borne in mind that the final loss would include only the invalids ultimately discharged the service in England, and that the remainder would pass to their depôts.

2. The Surgeon-General has given the health statistics for the Madras Army from 1858 to 1875, which enable the following comparisons to be deduced :—

	Per 1,000.	
	Average of 18 Years.	1876.
Admitted	1,351·66	1,098·09
Daily sick	62·11	52·01
Total deaths	18·73	15·63
Invaliding	46·98	42·94

The year 1876 was not a healthy year, and it is nevertheless satisfactory to know that there was a marked reduction in all the elements of inefficiency in that year over the preceding term, as follows:—

	Reductions per 1,000 strength in 1876.
Admitted	253·57
Daily sick	10·10
Total deaths	3·10
Invalided	4·04

The reduced death-rate includes cholera deaths, which gave a mortality in 1876 of 1·52 per 1,000, as against 2·20 per 1,000 for the preceding 18 years.

3. The sick, death, and invaliding ratios are still too high, and it appears to be necessary to deal with the facts more in detail.

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The chief death causes during the year were:—

	Deaths.	Percentage of Total Deaths.
Hepatitis	22	12·64
Enteric fever	21	12·07
Sunstroke	18	10·34
Cholera	17	9·77
Dysentery	17	9·77
Abscess of liver	4	2·30
Simple, continued, and remittent fever	5	2·87
	104	59·76

Out of 45 assigned death causes, which gave rise to 174 deaths, the eight causes in the above abstract occasioned 104 deaths, or nearly 60 per cent. of the mortality.

4. The most common causes of admission to hospitals were :—

	Number.	Percentage of Total Admissions.
Gastric and hepatic diseases	3,537	28·9
Fevers	2,254	18·4
Accidents	1,007	8·2
Respiratory	456	3·7
Debility	356	2·8
	7,610	62·0

These five causes gave rise to 62 per cent. of the admissions, and it is impossible to overlook the importance of the first two in the list, or the very large number of accidents.

From this latter cause one man in every 11 was in hospital for some kind of accident. Nine of them died from the results, which happens to be the same mortality as arose from the entire constitutional group of diseases.

5. The most common causes of invaliding were as follows :—

	For Change.	For Discharge.
Gastric and hepatic diseases	146	10
Debility	78	24
Constitutional group	56	39
Nervous system	22	21
Circulatory ditto	21	13
	323	107

As already stated, the total invalids were 356 for change and 122 for discharge, with which the numbers in this abstract may be compared. From all the facts it follows that the chief inefficiency causes in the Madras Army are gastric and hepatic diseases and fevers. There is nothing new in this result, but it is necessary year after year to call attention to the facts, because they show in what direction measures for protecting health should be applied.

6. The following abstract gives the ratios per 1,000 strength of admissions and deaths for gastric and hepatic diseases at the principal stations for 1876, in contrast with corresponding data for six years :—

Stations.	Per 1,000.			
	1870–75.		1876.	
	Admitted.	Died.	Admitted.	Died.
Fort St. George and Palaveram	124·3	4·42	155·25	1·52
St. Thomas' Mount	217·9	9·09	240·47	8·80
Trichinopoly	178·6	7·12	239·70	7·49
Bellary	122·2	2·10	91·31	—
Bangalore	147·1	3·34	140·16	5·48
Cannanore	328·9	8·42	112·07	1·44
Calicut	248·8	4·86	88·33	20·83
Malliapooram	326·4	3·27	129·03	10·75
Secunderabad	297·7	11·11	165·02	3·01
Kamptee and Seetabuldee	126·5	2·41	151·20	3·13
Rangoon	228·1	4·89	260·11	8·09
Thayetmyo	191·1	1·94	100·90	—
Tonghoo	294·7	5·51	442·01	6·57
Port Blair	96·9	1·29	104·48	—

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Leaving out the smaller stations, this abstract shows a decided decrease of these diseases at some stations. Secunderabad, which in the former six years had a very large death-rate from gastric and hepatic diseases, namely, 11 per 1,000, showed a death-rate of 3·01 in 1876. During the same year the death-rate among troops at Fort St. George and Palaveram was one third of the death-rate of the six years.

At Bangalore, Rangoon, and Tonghoo there was an increase of mortality. But at the other Burmese stations there were no deaths from these diseases.

The Report under review, which is chiefly devoted to departmental statistics, throws no additional light on the causes of hepatitis and its concomitants. But these facts showing the great prevalence of the whole class at many Madras stations appear to call for special inquiry. This view is merely a repetition of what has been said on the subject year after year, and yet we appear to be no nearer to a thorough knowledge of the removable conditions which predispose to these diseases. All that can be done is to repeat what has been said before, viz., that, admitting the influence of climate, properly so called, there is every reason to believe that most of the cases are due to drunken habits, unsuitable diet, and chills, especially at night, and we would strongly recommend that strenuous attempts should be made to reduce the predisposition to their occurrence by efforts at removing these conditions.

7. The febrile group of admissions presents some points of interest. The chief place in numerical importance in this class is not due to paroxysmal fevers, but to affections classed as "continued fevers," of which there were 1,459 admissions and 4 deaths. No fewer than 618 admissions from continued fevers are assigned to 3,286 troops in the Hyderabad Circle, or nearly 19 per cent. of the strength. The proper fevers of the country, namely, paroxysmal fevers, are debited with 610 admissions and one death. More than half the admissions from these fevers also took place in the Hyderabad Circle.

By far the most fatal fever, however, was enteric fever, from which there were 51 admissions and 21 deaths, against 23 admissions and 7 deaths in the previous year. Secunderabad furnished 42 of the cases and 14 deaths, mostly in two Infantry regiments, but all corps suffered. No account is given of the local causes of this fever, and the Surgeon-General states that "although carefully investigated, "no cause was assignable for these attacks. The disease was most frequent between the ages of 24 "and 26, and prevailed most in men under one year's service. Men of between four and five years' "service in India, however, furnished a large number of cases." It has been often suspected that the ætiology of enteric fever was somewhat different in India from that of the disease called typhoid fever in England; and this is not the first instance in which no cause of a local nature has been assigned for the occurrence of the disease. It has also been considered as one of the extreme results of malarial poisoning, "a typho-malarial fever." But, on the other hand, the experience of the connection of enteric fever with local filth causes infecting air, earth, and water has been so constant elsewhere that we should scarcely be justified in accepting the view that there were no assignable causes of this class for so fatal an outbreak, except on detailed evidence sufficient to prove their absence. It must be shown that the culinary water was free from all risk of contamination, a fact which has not been hitherto established for the water supply of this station; that there were no foul latrines near the barracks or hospitals, and no sources of air impurity from proximity of Native population or from other causes.

The importance of a very detailed inquiry of this kind is shown by the consideration that, if the views stated by the Surgeon-General be admitted, we must not only set aside the experience obtained in other parts of India, but we must be prepared to place to the account of youth and climate the occurrence of one of the most fatal diseases in existence. What is wanted in each case of enteric fever, as we have often pointed out, in an exhaustive detailed account of the local conditions under which the case took place, *whatever these conditions may have been.*

In the meantime, the incidence of enteric fever mortality in Madras Presidency in 1876 was as follows:—

Stations.	Strength.	Enteric Fever Deaths.
Secunderabad - - -	2,327	14
Wellington - - - -	447	3
St. Thomas' Mount - -	341	1
Thayetmyo - - - -	674	1
On the march - - -	192	2

There appears to have been no death at any other station from this disease. And it is not too much to ask that an account should be given in sufficient detail of the actual condition of the water-supply, surface and subsoil drainage, latrines, urinals, condition of barracks as to dryness, dampness, ventilation, overcrowding, and surroundings, wherever a case of enteric fever shows itself. This is no more than is required at home stations whenever complete information is required, and with the result that there has been no difficulty in detecting and removing the local conditions on which the cases depended. Should it turn out on inquiry that malaria is an efficient cause of enteric fever, the fact will be of great importance, but there is not sufficient evidence of it as yet.

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8. In 1876 there were 34 cases of cholera, of which 17 proved fatal, among British troops, as follow :—

	Deaths from Cholera.
Madras	6
Secunderabad	3
Wellington	5
Bellary	1
On the march	2
Total	17

There is no account of the local conditions under which these attacks took place. A considerable proportion of the cases "was contributed by a small party of recruits and others proceeding "from Bombay and intermediate stations to Wellington on march, the disease being contracted "*en route.*"

9. Under the head of "*General remarks on sanitary matters,*" the following improvements are stated as having been carried out during the year :—

A new hospital for 90 men had been commenced at Poonamallee.

The surface drainage at Bellary had been improved, and two new barrack blocks for Infantry had been completed and occupied.

At Trichinopoly the hospital had been repaired and improved.

At Bangalore the drainage is reported as having been "much improved," and an Infantry canteen and recreation room had been completed and handed over.

A block of quarters to hold 148 men was completed at Wellington.

It is worthy of note that at Cannanore, the former head quarters of enteric fever, drainage and conservancy arrangements had been improved, a new canteen and guard room had been completed, and a swimming bath was in course of construction. This station had no enteric fever deaths during the year.

The dry-earth system was introduced at Malliapooram.

In Hyderabad Circle, new Cavalry lines, a barrack block, new stabling, officers' quarters, guard, plunge bath, &c., had been handed over. "The chief well has been roofed over and provided with "a pumping apparatus and large cistern."

Besides minor improvements, three Infantry barrack blocks at Kamptee have been enlarged and ventilated, and others were being improved.

At Rangoon two Infantry barrack bungalows were completed, and a third was under construction. Several minor repairs and improvements in drainage, ventilation, &c., were carried out.

10. The only other point in the Report to which attention might have been called is the amount of syphilis among troops at the different Madras stations, but, as this subject has been discussed on other papers, it does not call for remark.

11. The practical results of the year's returns may be summed up as follows :—

(1.) The health of British troops in Madras Presidency is slowly improving.

(2.) Nevertheless the occurrence of so many fatal cases of hepatic and gastric disease points to the necessity of examination into the personal habits of the men to which such diseases may be due, such as spirit drinking, too small a proportion of farinaceous and vegetable diet, or too much animal food, night chills, and the like.

(3.) Some account is required of the diseases classed as "continued fevers."

(4.) The information about enteric fever is not satisfactory, and the Commission would recommend, as they have often done before, that a detailed account (not an opinion merely, which is of little use) should be given of the local and personal conditions under which each case of this fatal disease occurs, with the view to remedying any local defects which may be found in the conditions already mentioned.

In conclusion, the question of the ætiology of these Indian continued fevers is of so much importance that each case of typhoid fever so called should be related in detail, with a careful inquiry into all the surroundings, and, as far as possible, devoid of all preconceived opinions as to the causation of the disease. The record of each case should include temperatures, periods of exacerbation and decline, duration, &c., and careful *post mortem* examinations should be recorded, including microscopical examinations of the blood, &c., to ascertain whether any special organisms are present.

4th March 1878.

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No. 14.

Memorandum of the Army Sanitary Commission on the Health Returns of British Troops in Bombay for 1876.

It is proposed, as in preceding years, to limit the remarks of the Commission in these papers solely to points stated in the observations of the Surgeon-General, British Troops, which accompany the returns.

1. The following table gives the numbers of British troops, &c., arriving in Bombay from England during the season 1876–77, together with the dates of sailing and arrival and the casualties on board:—

Troop Ships.	Date of Sailing.	Date of Arrival.	Officers.	Ladies.	Children.	Troops, &c., in Health.			Female Servants.
						Men.	Women.	Children.	
Crocodile - -	16th Sept. 1876	24th Oct. 1876	57	10	10	966	89	129	2
Malabar - - -	1st Oct. „	8th Nov. „	49	12	12	990	70	71	2
Jumna - - -	17th „ „	22nd „ „	79	12	7	1,062	73	89	5
Serapis - - -	28th „ „	6th Dec. „	80	7	4	1,066	60	90	3
Crocodile - -	29th Dec. „	31st Jan. 1877	75	9	9	1,055	120	145	1
Malabar - - -	12th Jan. 1877	14th Feb. „	59	12	5	1,023	60	68	2
Jumna - - -	25th „ „	28th „ „	74	13	7	1,039	39	58	4
Serapis - - -	9th Feb. „	14th Mar. „	66	14	15	939	79	110	3
Euphrates - -	23rd „ „	28th „ „	78	13	6	2	1	3	7
			617	102	75	8,142	591	763	29
	Deaths on voyage - - - - -					2	3	6	—

Causes of Death.

Men - - 1 delirium tremens; 1 pneumonia.
Women - - 1 peritonitis; 1 heat apoplexy; 1 broncho-pneumonia.
Children - - 3 diarrhœa; 2 bronchitis; 1 convulsions.

2. We have had occasion in previous Memoranda to remark on the low death-rates on board these troop ships, and a similar fact presents itself in the present papers. Although the deaths among women and children were too numerous for so short a voyage, still, the assigned death causes are not from diseases the result of removable sanitary conditions, except perhaps in the case of children who thrive badly where there is crowding as on board ship.

The deaths were not from ship-board diseases, but were from the same causes which make up children's death-rates on shore. One woman died of the climate, the other two from inflammatory diseases.

One man died from delirium tremens, no doubt by his own fault. The other from pneumonia, during a December and January voyage, possibly the result of exposure. Taking both deaths together they only give a death-rate of about 2½ per 1,000 per annum. Of course if the delirium tremens case had not died the death-rate would have been half the amount.

3. There are two points in the ship reports which may be noted; first, the occurrence of diarrhœa among young children, which one Medical Officer considers may be lessened on these voyages by having a cook for young children. What is just as much wanted, perhaps, is better management on the part of the parents, and the question suggests itself whether, as these diarrhœal diseases cause so high a death-rate among young children in India, the Medical Officer might not with advantage bring under notice of mothers the instructions issued by the Director-General in this matter several years ago.

The other point is one which admits of easier remedy. It appears that men suffering from venereal diseases were embarked for India during the trooping season, some of them having been discharged direct from hospital on purpose. It may be suggested that as men in this condition are of little use to the service they may as well be kept in hospital until recovered.

4. In all other matters the troop ships are favourably reported on by Medical Officers. Out of 8,142 men embarked for India it is satisfactory to learn that 5,139 arrived at Bombay during the cold season up to January 31st of the present year 1877. During February the arrivals in Bombay were 2,062, and during March up to the 14th of the month there arrived 939 men, after which date only 2 men were landed, on the 28th of the month.

During the same trooping season the return voyages of the ships with supplemental aid from one of the Peninsular and Oriental Company's steamers brought to England the following troops, invalids, &c.:—

Officers - - - - -	385
Ladies - - - - -	111
Children - - - - -	174
Men in health - - - -	5,550
Women in health - - - -	653
Children „ - - - -	1,577
Invalids.	
Men - - - - -	2,220
Women - - - - -	326
Children - - - - -	744
Insanes - - - - -	80
Ignominy men and convicts - -	136

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Of the invalid soldiers embarked, 792 would arrive in England during the cold months preceding the beginning of April. All the others would arrive at later dates and in milder weather.

5. During the year 1876 the sickness and mortality among British troops in Bombay Presidency were as follows:—

Average strength	10,362
Admissions to hospital	13,292
Total deaths	128
Average daily number of sick	508·75

The ratios of sickness and mortality in 1876 afford the following points of comparison with those of the preceding 10 years, 1866 to 1875:—

	Ratios per 1,000 Mean Strength.		
	Admitted.	Died.	Constantly Sick.
10 years average, 1866—1875	1,380	16·08	54·36
1876	1,283	12·35	49·

The most marked difference in these figures lies in the lower death-rate of 1876, which is 3·73 per 1,000 under the average. But no undue importance can be attached to this result in face of the fact shown in another part of the Surgeon-General's observations, viz., that the average ratio per 1,000 of invalids was 35·95 for the seven years 1869–75, while in 1876 the ratio had risen to 47·52, showing an excess of 11·57 per 1,000 in this inefficiency cause.

A table in the Report enables the following comparisons to be made between the death-rates of Officers, Non-commissioned Officers, and privates:—

Years.	Deaths per 1,000.		
	Officers.	Non-commissioned Officers.	Privates.
1869 to 1875	11·53	22·59	15·43
1876	13·59	15·27	12·07

Taken together, the losses from deaths and invalids among private soldiers have been as follows:—

	Ratios per 1,000 Strength.	
	1869 to 1875.	1876.
Deaths	15·43	12·07
Invalids	35·95	47·52
Total losses	51·38	59·59

It is proposed simply to leave the facts to produce their own impression. Since the death-rates have fallen the importance of high invaliding rates to the efficiency of the Indian Army has become more manifest.

6. The next abstract gives the proportion per cent. of the total admissions and deaths attributable to the more important inefficiency causes for 1876:—

	Per-centage of total Admissions.
Non-eruptive fevers, including enteric fever	38·67
Venereal diseases	13·35
Hepatitis and abscess of liver	3·29
Anæmia and general debility	2·63
Dysentery	1·96
Malignant cholera	0·08

	Per-centage of total Deaths.
Abscess of liver and hepatitis	20·31
Non-eruptive fevers, including enteric fever	15·62
Phthisis pulmonalis	7·81
Pneumonia	6·25
Dysentery	4·67
Sunstroke	4·67
Malignant cholera	1·56

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With reference to the low cholera mortality of the year it may be stated, as an additional proof of the fact that very little is yet known of the epidemic causes of this pestilence, that in the preceding year the cholera mortality was 25·23 per cent. of the total deaths.

7. There were altogether 482 men invalided. The more prominent causes were as follows :—General debility, 132 ; hepatic diseases, 61 ; fevers, non-eruptive, 48 ; syphilis, 33 ; phthisis, 25; dysentery, 22; insanity, 9 ; rheumatism, 20 ; respiratory, 12 ; diseases of heart and blood-vessels, 31.

8. No very accurate deductions can be drawn from the statistics of a single year, but as part of the year's history the following facts are interesting. The most healthy troops in the Bombay Command were those on the march. Their sickness amounted to 680·85 per 1,000, and the death-rate was 5·32 per 1,000. The whole Belgaum district yielded an admission rate of 953·49 per 1,000, and a death-rate of 7·08 per 1,000. The lowest death-rates at stations were 6·37 per 1,000 at Ahmednuggur ; 7·59 at Bombay ; and 7·81 at Mhow. The highest death-rates were 24·81 per 1,000 at Neemuch, and 45·70 among non-effectives. The Aden Brigade yielded the lowest admission rate, viz., 779·47 per 1,000. And the highest 2,200, took place at Hyderabad. There appear, however, to have been other facts besides those of locality engaged in the production of some of the results.

9. *Chief diseases.*—As already stated, the highest mortality causes were hepatitis and abscess of liver. They yielded 437 admissions and 26 deaths. They were most prevalent at Kirkee, Mhow, and Ahmednuggur ; and the mortality was highest at Kirkee. This is partly accounted for by the locality at Bombay where the D/C Royal Horse Artillery was encamped in the latter end of 1875. "A great "part of the island lies beneath the level of the sea, and is converted into a lake during the monsoon ; "the accumulated water gradually evaporates after the cessation of the rains, but the ground long "remains damp, and in a condition calculated to originate malaria and to give rise to dysenteric and "hepatic affections." The disease showed itself after the return of the battery to the dry and cool climate of the Deccan. Such is the account of the matter given by the Surgeon-General. It may be asked whether any representation against the Bombay Camp site had been made beforehand, and if so why no attention was paid to it. There is, however, another matter on which there is no information, viz., whether the men indulged in drink during the visit of His Royal Highness the Prince of Wales, on whose account they had come to Bombay? There is sufficient cause for suspicion in this matter from the well-known habits of British soldiers in the Presidency, a subject to which the Commission has often called attention.

10. *Fevers.*—The fever admissions amounted in 1876 to 49·60 per cent. of the strength, and the deaths to 0·19 per cent. Of this amount ague yielded 38 per cent. admissions, but no deaths. Remittent fever showed 2·67 per cent. admissions, and 0·03 per cent. deaths.

The most fatal fever was enteric fever, which yielded 0·49 per cent. admissions, and 0·16 per cent. deaths. Of enteric fever there were 51 admissions, and 17 deaths. There were 13 cases and 6 deaths from this fever at Neemuch. Of the 13 attacks 10 were in men under 25 years of age.

The Surgeon-General gives the following account of the origin of the disease at the station. It was attributed, he says, to "a foul latrine belonging to the old barracks. This latrine was therefore "abandoned, and the battery moved from the old into the new barracks, which were at the time "approaching completion."

Whether or not this "foul latrine" was the cause of these enteric fever deaths, it is not too much to say that, after all the discussions on these subjects in India for many years past, the existence of foul latrines at Neemuch, or at any other station, can be considered in no other light than a neglect of duty.

At Nusseerabad there were six cases of enteric fever among men, and four cases among women and children. "Some of these cases," the Surgeon-General says, "were doubtfully attributed to the existence of "manure heaps in the Commissariat garden, some to the proximity of Native latrines, "and some to other causes." Again, the question must be asked, who is responsible for permitting such things to exist near quarters of British troops?

In other cases the youth of those attacked, and recent arrival in India, are assigned as predisposing causes, and the character of the fever generally appears to be influenced by local malaria and climates. In one report the fever is described as a sort of "typho-malarial" fever.

The fatal cases took place at the following stations :—

	Deaths from Enteric Fever.
Neemuch	7
Poona	4
Mhow	2
Aden	1
Ahmedabad	1
Asseergurh	1
Baroda	1
Total	17

11. Among removable causes of enteric fever it may be safely stated that the "filth" element at Indian stations is the most important. It may proceed, as in two of the present outbreaks, from obvious causes, which ought not to be permitted to exist at any station ; or it may be the result of foul Native habits, or of impure water, or of damp foul subsoil, or of saturated walls of old barracks. The fever may be modified by local malaria, but wherever a single case presents itself the cause of it ought to be hunted out and destroyed. Enteric fever is one of the best tests of the presence of filth causes, but the whole practical results of sanitary effort will be nugatory if a wrong road is followed in the hope of discovering some specific cause at the end of it. The duty of the Sanitary Officer begins with the discovery and ends with the removal of visible tangible disease causes, and if the work is well done the specific cause will have been effectually dealt with in the process.

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12. *Malarial fevers.*—The lowest admission-rates from malarial fevers were at Khandala and Asseergurh, 10·53 and 11·63 per cent. of the strength. The highest rates were 108·58 per cent. at Bombay, and 135·65 per cent. at Hyderabad.

The per-centages vary considerably from year to year, but the following summary appears to show that the amount of ague is diminishing irregularly :—

Years.	Ratio per 1,000 Admissions to Strength.
1870	542·67
1871	518·36
1872	483·07
1873	410·94
1874	327·28
1875	378·90
1876	380·12

13. *Venereal Diseases.*—There are 12 lock hospitals in Bombay Presidency, the results of which are shown by the Surgeon-General for six years after their establishment, as contrasted with the amount of venereal disease among the troops for the preceding six years.

The figures are curious as showing the gradual decline of the disease from 1862, when the admission-rate was 317 per 1,000 strength, to 197 per 1,000 in 1868, the year before the hospitals were opened. The year 1869 shows an admission-rate of 157 per 1,000, and since this year there has been no decline continuously. The numbers since lock hospitals were opened have been as follows:—

	Per 1,000.
1869	157·
1870	184·
1871	160·
1872	148·
1873	179·
1874	164·
1875	165·
1876	179·

Taking into account the rapid decline of the years 1862, 1863, 1864, it would be safe to adopt the average of the four years 1865–68, steady at about 200 per 1,000, as the old normal amount of the disease, and by comparing the numbers in the above table with this normal average a tolerably accurate estimate of the effect of lock hospitals may be realized, *i.e.*, on the assumption that there were no other reasons for the reduction. During the last 12 years venereal admissions have fallen from 201 to 179 per 1,000, or about 11 per cent., and during eight of these years the lock-hospital system has been in use.

To form a correct judgment on the real results of the lock hospitals, it would be necessary to have a classification of the cases, both among troops and among women at the stations. The evidence, such as it is, shows a reduction, although not a decisive one, in the amount of venereal affections; and the practical conclusion follows that, with nearly 18 per cent. of the troops admitted for venereal diseases, lock hospitals cannot be considered as very successful institutions.

14. *Sanitary condition of stations.*—There is no account given of the sanitary state of stations on which any recommendations can be made. A number of points of detail are mentioned by Medical Officers, and a table is given at the end of the Report showing the steps taken on the recommendations. In some cases the matters referred to have received attention, in others inquiry was to be made, and in some the requirements could not be fulfilled for want of funds. The most important information on actual sanitary work is, that at Neemuch three new upper storied barracks and 15 married quarters have been taken into occupation. Also one barrack at Ahmedabad, and 28 married quarters at Colaba.

The main practical result of the Report is that the sanitary improvement of stations should be pressed forward, and that the causes of enteric fever at affected stations should be hunted out and removed without loss of time.

15. *Women and Children.*—The tables in the Report afford satisfactory evidence of progressive improvement in the health of soldiers' wives and children. During the last four years the women's death-rates have been, in round numbers, 16, 18½, 18, and 15 per 1,000. Their average death-rate for nine years has been 15·11 per 1,000 as against 12·35 per 1,000 among men.

The children's death-rate, which was about 10½ per cent. in 1867, and nearly 15 per cent. in 1869, was 44·79 per 1,000 in 1876, as against an average rate for the preceding nine years of 83·93 per 1,000.

The chief death causes among women are diarrhœa, pneumonia, apoplexy, and heart disease, which together gave rise to 64½ per cent. of the mortality.

Cholera itself is debited with 5·88 per cent., the same amount as small-pox. Of the children's deaths 56 per cent. are due to dysentery and diarrhœa, teething, and convulsions, showing the need of care in bringing up children in Indian climates, and of greater care on the part of women also. But when compared with older experience, it must be admitted that India is no longer necessarily the deadly country it was once for Europeans, and that the future healthiness of the climate depends very much on all parties adapting their habits to its requirements in dwellings, clothing, food, and drink. Considering all that has been done to improve stations and barracks during the last 12 or 14 years, there is no doubt that the death and invalidating rates of British troops would have been lower than they are had the men been more temperate in their habits. It is to a large extent in the reduction of the use of intoxicating drinks that future progress in the health of troops is to be looked for.

20th February 1878.

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No. 15.

Memorandum of the Army Sanitary Commission on the Medical and Sanitary Report of the Native Army of Bengal for 1876.

This volume contains abstracts of reports by Medical Officers of Native Regiments, to which is prefixed a general summary by Dr. Fullarton Beatson, Surgeon-General, Indian Medical Department, and the volume is concluded by the usual statistical tables, and an appendix by Deputy Surgeon-General, J. T. C. Ross, giving an account of the sanitary arrangements of the camps of the Delhi Assemblage in December 1876 and January 1877. Most of the volume is occupied by purely departmental details not within the scope of our work. There are however, some points of practical sanitary importance, and these we propose to consider in the following paragraphs.

1. The statement No. 1, given by Dr. Beatson, shows the strength of the Bengal Native Army during 1876 (omitting fractions) to have been:—

	Strength.		
	Present.	Absent.	Total.
Regular Army	39,234	5,510	44,744
Central Indian Field Force	4,478	1,207	5,685
Punjab Frontier Force	10,130	2,092	12,222
Total	53,842	8,809	62,651
Madras Army	2,897	182	3,079
Grand Total	56,739	8,991	65,730

2. The next abstract gives the sick and death-rates among these different classes of troops for 1876:—

	Ratios per 1,000 strength.		
	Admissions.	Daily Sick.	Deaths.
Regular Army	1428·1	39·4	15·4
Central Indian Field Force	874·1	30·1	9·6
Punjab Frontier Force	1567·5	41·7	14·8
Army of Bengal	1404·7	39·1	14·7
Madras Troops	1048·7	25·9	12·3

The admissions are numerous, especially in the Punjab Frontier Force; the daily sick-rate is not very high, and the death-rates are below the average of five years, including 1876.

The actual number of deaths was as follows:—

Died in hospital	555
„ in the lines	13
„ on sick leave	354
Total deaths	922

The average number of men in hospital was 2,103, or nearly three battalions of 715 men each, and the admissions amounted to 75,626.

The average death-rate for 10 years, 1866 to 1875, was 18 per 1,000. In 1876 it was 14·7 per 1,000. In the same way the sick in hospital during the same 10 years averaged 43·4 per 1,000, and in 1876 39·1 per 1,000. There was a slight increase of admissions in 1876 over the previous 10 years (1,404 against 1,365 per 1,000).

Favourable as are the figures when compared with those of previous years, they show ample room for sanitary improvement.

3. These averages, however, give an imperfect idea of the sanitary questions to be dealt with.

Thus the admission-rate at Ferozepore was no less than 3,716 per 1,000 strength; it was 3,664 at Barrackpore, and 3,514 at Peshawur. These are the extreme rates of the year. In the same way the average daily sick at Ferozepore was nearly 95 per 1,000, and 83 per 1,000 at Barrackpore. While at the opposite extremity of the scale stands Bareilly, with 261 admissions per 1,000, and a sick-rate only a shade above 9 per 1,000.

The death-rates varied in a similar manner, between 102·7 per 1,000 at Julpigoree, and 2·2 per 1,000 at Morar.

There were two stations, Umballa and Abbottabad, with no deaths in certain corps; and, nevertheless, at the former the admission-rate was 1,910 per 1,000, and at the latter 2,034 per 1,000. Even Ferozepore, with its enormous admission and sick rates, had a death-rate of only 12·9 per 1,000. These contrasts are of usual occurrence, and the only reason for again adducing them is to show that in dealing with sanitary questions bearing on the general efficiency of troops the death-rates alone do not afford sufficient guidance for practical work.

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4. On analysing the admission causes it is at once seen that chief among them must be placed "fevers," from which Dr. Bryden's statistics show that in the Bengal Native "Regular" Army there were 32,405 admissions in 1876. Of this number 15 were cases of enteric fever, 340 were of remittent and continued types, and 32,050 of intermittent. Eight-tenths of the troops suffered from fevers. Dysentery yielded 2,800 admissions, diarrhœa 1,376, respiratory diseases 2,174, and rheumatism 2,117 admissions.

On the other hand, hepatitis, a disease so prevalent among British troops that the European Army in Bengal yielded 1,695 admissions or 46·3 per 1,000 strength, in the Native Army yielded only 61 admissions or 1½ per 1,000 strength.

The Bengal Native Regular Army had 119 cases of cholera, and the Bengal European Army 163. The rate was for the former Army 3 per 1,000, and for the latter 4½ per 1,000.

The chief death cause in the whole Bengal Native Army was fever, which gave rise to 23·24 per cent. of the total deaths. Next in order followed cholera, with 15·85, and pneumonia, with 15·68 per cent. of the total deaths. Dr. Bryden gives the following deaths from the chief causes in the Native Regular Army, 39,494 strong:—

		Deaths.
Fevers	Intermittent - - - 43	
	Remittent - - - 34	- - 83
	Enteric - - - - 6	
Cholera - - - - - -		73
Respiratory - - - - -		91
Phthisis pulm. - - - - - -		36
Dysentery - - - - -		34
Diarrhœa - - - - - -		24
Atrophy and anæmia - - -		26
		367
All others - - - - - -		79
Total deaths - - -		446

These facts will give a sufficient general idea of the sanitary condition of the Native Army for 1876.

5. The following facts regarding cholera are of interest:—

Years.	Deaths from Cholera.
1869	345
1870	28
1871	30
1872	208
1873	28
1874	29
1875	58
1876	88*

The actual cholera deaths in 1876 amounted to 104, but 16 of these took place in men not at stations. The list thus amended shows a cyclical augmentation of the disease in Native regiments.

The following stations yielded the largest number of deaths from cholera in 1876:—

Stations.	Cholera Deaths.
Peshawur	23
Dinapore	14
Edwardesabad	7
Cachar	6
Barrackpore	4
Lucknow	3

The Medical Officer calls attention to the fact, that of these three deaths at Lucknow, two took place at Fort Muchee Bhawun, and moreover, that out of 23 cases of cholera during the last six years, 13 have come out of this fort, certainly a sufficient reason for special inquiry as to the localising causes of the disease there.

There were 29 cases of cholera, and 12 deaths in the Bolan Pass and *en route* to Khelat, as already stated.

During this year Peshawur fully sustained its unfavourable reputation for high mortality.

6. We called attention a year ago, to the great prevalence and fatality of chest diseases in the Bengal Native Army in previous years, and the present Report states the following facts on this important subject for 1876:—

	Bronchitis and Bronchial Catarrh.		Pneumonia.		Pleurisy.		Other Chest Diseases.		Total.	
	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
1876 - -	1,960	19	421	87	175	9	253	10	2,809	125

* Including 12 deaths in the Bolan Pass, and *en route* for Khelat.

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The admissions from all chest diseases were 2,922 in 1875, or 112 more than in 1876. The deaths also in 1875 exceeded those in 1876 by 86. The great reduction of diseases in this class in 1876 has, however, been in pneumonia as follows:—

	Admitted.	Died.
1875 - - - -	701	177
1876 - - -	421	87
Reduction - -	280	90

On the evidence stated in past Reports we attributed the prevalence of pneumonia in Bengal Native regiments to defective clothing and dieting. We are glad to learn in the present Report that this matter has been taken in hand, and that authorities and Medical Officers are fully alive to its importance, "and the mortality from pneumonia in those stations in which it was considered to be epidemic, if not "contagious, has most markedly decreased." More liberal allowances have also been made to hospitals in the matter of clothing and warming. The chest disease death-rate is still much above what it ought to be. On this subject we concur entirely with Dr. Beatson's view, that "notwithstanding the boon "of additional allowances, which to the miser means increased savings, I hope the great necessity there "is for still bestowing close attention to the questions of food and undress clothing will not be lost "sight of, as they play an important part in preserving the health and increasing the efficiency of an "army; most markedly so when the men are engaged on active service." What is now required, therefore, is that all classes of Officers should see that the advantages given by the State are fully made use of for the interests of the State, and not for the soldiers' own private ends.

7. The old question of "foot lameness" comes forward again in this Report. There were, it appears, no fewer than 2,298 admissions to hospital from this cause in 1876, or an increase of 202 admissions over the average of the preceding five years. The causes and remedies for this amount of inefficiency in the Native Army are too well known to require remark, and we are glad to learn that His Excellency the Commander-in-Chief has himself drawn the special attention of commanding Officers to the subject.

8. So far as can be learned from the regimental reports, the general sanitary condition of Bengal stations of Native troops appears to be more or less satisfactory. Cleansing is well reported of. There are various latrine systems in use, which on the whole appear to be well cared for. Water-supply, with exceptions, appears to be of fair quality, but Dr. Beatson makes an important recommendation on the subject of water analysis which should be adopted, viz,, that Medical Officers should keep up their knowledge of this matter by frequent analysis of water samples at stations where they are serving. This indeed is part of their duty, and they receive training at Netley in order to be able to fulfil it. The use of gymnastics is favourably reported on from a number of stations, and it is not too much to expect that every station, whether of European or Native troops, should now have the means of affording the advantages of healthy occupation which they offer,

9. The chief disease causes dwelt on in the regimental reports are those connected with paroxysmal fevers, namely, low, sometimes irremediably bad, sites of stations, liable to overflow of rivers and to malaria from extensive marshy areas. There are several stations of this class which could only be improved, if at all, at an outlay probably in excess of the cost of reconstruction and removal to better sites.

Of removable causes of malarial fevers, badly constructed huts of unsuitable material are often mentioned. On this subject the following remarks by the Medical Officer of 41st Native Regiment at Morar merit attention:—

"What to my mind seems another serious want * * is the absence of any flooring upon the "ground space enclosed in these huts. Now as much evidence has accumulated in support of the so-"called telluric origin of intermittent fevers,—the theory, namely, which adduces exhalations from the "soil as a chief cause of these fevers,—it would seem to be of importance to screen the men from the "operation of this cause. * * * Lying, then, as the men do on low charpoys in the absence of any "flooring, they are certain to be affected by such exhalations, and this, combined with the restricted "air space is, so far as I can see at present, the cause of the numerous admissions from fevers at this "station. Further, during the rains, the ground in the huts must become damp by soakage from the "wet soil outside." He suggests, as a remedy, isolating the hut site by drain trenches, and covering the floor with cement or concrete.

The evil here described represents simply the normal condition of Native huts throughout the army, and it can only be effectually dealt with when new lines are being constructed by raising the floors on piles in the way practised in Burma, where in a wet malarious climate the admission-rate among Native troops from intermittent fever was 159 per 1,000 in 1875, while in the Bengal Native Army, the fever admission-rate in the same year was 492 per 1,000, and in 1876 the rate was 565 per 1,000. Remembering what the suffering from fever at some stations in Burma was at the beginning of the occupation, it is evident that improved health there is not due to any change of climate, but probably to the use of a method of hutting in conformity with its requirements. In existing Bengal Native lines the only remedy is isolating hut sites by drainage, raising hut floors as far as practicable above outside levels, constructing the floor of some dry impervious material, and inducing the men to sleep as high as they can above the floor level. In fact, now that so much has been done in the way of improvement of Native lines, we are brought face to face with the question of subsoil drainage, and with the enormous fever inefficiency rate resulting from the present malarious soil conditions of Native stations.

This conclusion is the real practical result of the facts contained in the regimental reports, and the time appears to have arrived for dealing with it.

10. In the absence of Indian experience of subsoil drainage, we advised a number of years ago that one station at least should be thoroughly drained, and its results to health recorded, and we are glad to learn that Dr. Beatson had advised this course in his report of 1875, and that the Government

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of India had directed him to submit the name of a station for the trial. He consequently called for the opinions of Medical Officers of military circles, and he gives in his present Report the names of stations proposed to be drained. These are—

Barrackpore.
Cachar and Gowhatty.
Dinapore.
Banda.
Agra.
Lucknow.
Mooltan and Meean Meer.
Edwardesabad.

Before deciding as to an example, Dr. Beatson advises that the opinion of the Surgeon-General, British Forces, be also taken. The station selected ought to have accommodation for British as well as for Native troops. To drain every one of the stations on the list, and many more, would no doubt be advantageous, but as the object is to obtain experience, it may be suggested that the selected station should have no prominent disease cause but such as is connected with the soil. It ought to have good water, for example, it should not be infested by jungle, and there ought to be no undrainable marsh land close to it. The amount of malarial disease ought to be sufficient to admit of large and visible reduction ; and if there be fogs at the station, the effects of drainage on them could also be noted. Before beginning drainage works the usual depth of subsoil water from the surface should be recorded. Something will depend on the nature of the subsoil, but even clay soils get drier in time after drainage. Without prejudging any local engineering opinion on the question, we would merely suggest Barrackpore as a likely case for trial. Its sanitary history has been long known, and for other reasons it would make apparently a suitable test case.

The general principles on which subsoil drainage works should be carried out at such stations were laid down in 1863 in our suggestions for the sanitary improvement of Indian stations, subject of course to improvements in the methods deducible from local knowledge.

The subsoil drainage which has been effected by the main sewerage and drainage works at Calcutta might possibly afford much useful practical experience.

11. The general conclusions from this Report on the Native Army of Bengal for 1876 are obvious enough.

(1.) Most of the stations appear to have been undergoing considerable improvements in details ; and the general sanitary condition of troops has been gradually improving, except in the amount of diseases not specially connected with the disease causes which appear to have been dealt with.

(2.) The great inefficiency cause is still "fever," which prevails at all the stations, but with manifold greater intensity at some stations than at others, a fact which points to the necessity for careful and exhaustive inquiry into causes of subsoil, damp, and malaria, within the limits or in the neighbourhood of the more severely affected stations.

(3.) The immediate fever causes brought out by the reports are those obviously connected with wet or damp subsoil under huts, and damp hut walls from wet rising out of the foundations. In such climates as exist at most Indian stations, this form of hut construction and material are dangerous to health and efficiency, and the Commission would strongly advise that the whole subject of hutting Native troops should be reconsidered, and healthy material and construction adopted wherever huts have to be renewed. The Burmese experience is strongly in favour of raising the hut floors in all malarial districts above the ground level, with free circulation of air beneath ; and it would be well worth the cost to try this plan, for example, at such a station as Gowhatti, where the local conditions scarcely admit of drainage of the site.

(4.) Subsoil drainage of stations will have to be adopted in the end, and we would strongly advise that Dr. Beatson's proposal, which is our own also, to select a station and drain it thoroughly as a trial case, be adopted.

(5.) The satisfactory reduction in the mortality from pneumonia during 1876 points to the advantage of strict attention being paid to the subject of clothing and dietary of Native troops at stations where this disease prevails.

12. Before concluding the present memorandum, it may be useful as well as interesting to introduce a brief statement of sanitary measures adopted under the superintendence and direction of Deputy Surgeon-General Ross for protecting the health of the vast assemblage at Delhi on the occasion of the proclamation of Her Majesty's title of Empress of India, on 1st January 1877.

Early in the preceding November, Medical Officers, 26 in number, were named in all parts of India to attend to the sanitary requirements of their camps.

They had to supply all the necessary information as to numbers, routes, medical service, &c.

The camp police service was organised with special reference to conservancy arrangements, sweepers, &c.

All camp sites were, at the same time, marked out, and the ground levelled, cleared, and roads made.

The best wells were selected and marked for use, and galvanised iron buckets and chains advised for drawing water. Suitable latrines and urinals were constructed, and sufficient means for removing all impurities to a distance, with suitable receptacles, were provided.

The sanitary arrangements of each camp were under the direction of one Medical Officer, with subordinates, and in all the camps Native officials conversant with sanitary measures in towns were told off for service. By the time the camps were occupied everything was in good working order, as of necessity it must have been, since provision had to be made for 68,000 people, the population of a considerable city.

Exclusive of the military camps, which had their own sanitary arrangements, the following population had to be provided for :—

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Imperial Camps.

	No. of Tents.	Population.
Tents for British Officers, &c.	777	733
Tents for clerks, troops, followers, &c.	1,209	9,828
Miscellaneous camps	243	349
Ditto clerks, &c.	356	6,438
	2,585	17,348

Camps of Chiefs, &c.

Total tents for chiefs, families, troops, and followers	4,208
Population of private tents	968
Troops	14,443
Followers	35,330
Total camp population	68,089

Besides this large population whose sanitary arrangements had to be attended to there was a floating population which went and came day by day.

The Assemblage lasted 14 days, and the following were the results of the whole proceedings to the public health, bearing in mind that the weather at the time was cold, and that the people had come from all varieties of Indian climates:—

Europeans.—Catarrhs were prevalent, a few bronchial attacks, one case of acute pleurisy. No deaths, health generally excellent.

Among 16,000 Natives in the Imperial Camp, there was no sickness of any sort; there were two deaths in chronic cases of fever and spleen.

Camps of Chiefs.—General health reports uniformly good; but some suffering from climatic changes.

There were 10 deaths from the following causes:—

Pneumonia	7
Bronchitis	2
Dysentery	1

During 34 days service, the Punjab Police force, 4,176 strong, had 80 admissions to hospital; and there were 4 deaths from pneumonia.

It will be observed that there were neither cases nor deaths from any of the diseases which usually infest unregulated fairs and pilgrimages in India, and that the sickness and mortality were due to season and climate acting on people coming into a northern district from all parts of the country in the winter, and with the temperature unusually low.

The facts fully justify Deputy Surgeon-General Ross's decision on them, namely, that "the "organisation for the medical and sanitary arrangements and supervision of the camps assembled was "most efficient."

And the practical conclusion from the experience is, that similar measures, mainly rigid attention to cleanliness and pure water, may be confidently expected to lead to the same satisfactory results elsewhere in India. But the experience has value of another kind, for it shows that, even in India, exposure to climatic changes without suitable precautions in the way of clothing, shelter, &c., produces the same results in fatal inflammatory chest affections as it does in colder climates. In their own country the Natives suffered from these diseases, while the Europeans, who took better care of themselves, escaped.

The importance of the experience as bearing on the question of fatal chest diseases in the Native Army is too obvious to require comment.

25th June 1878.

No. 16.

Memorandum of the Army Sanitary Commission on the Medical and Sanitary Report of the Native Army of Madras for 1876.

This Report, as its title indicates, is chiefly occupied with departmental details not calling for remark by the Commission.

There is not much information in the reports of Medical Officers on the general sanitary state of stations, apparently because this important element in the health of troops is considered to be, on the whole, not unsatisfactory, although, as will be presently evident, considerable improvements are required, especially in the drainage of certain stations.

The details are summed up in an instructive report submitted to the Government by Dr. George Smith, Surgeon-General, Indian Medical Department, from which, and from the regimental reports, the following practical points have been selected for notice.

1. The following paragraph, from Dr. Smith's report, states the conditions of life among the Native population generally for the time being:—

"In 1874 the rainfall was good, the crops above the average, the food supply abundant, and prices "moderate. In 1875 the rainfall was seriously deficient, the crops scanty, and the prices steadily "rising. In the year under review the ominous warnings of the preceding year culminated in a "famine of grain and of water, in the establishment of relief camps and institution of relief works, and "in widespread suffering and mortality from starvation and pestilence."

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Of the Native population exposed to those unfavourable climatic conditions, a force of 27,737 men of the Native Army, scattered over all the Presidency, yielded the following health statistics:—

	Ratios per 1,000 Strength.
Admissions	769·2
Daily sick	27·7
Total deaths	13·8
Invalided for discharge	32·9
Invalided sick leave	21·1

The sick-rate of 1876 was below the average of the three preceding years; but the death ratio was higher, as is shown by the following comparison:—

	Deaths per 1,000.
1873	9·2
1874	9·9
1875	11·7
1876	13·3

It is possible that some explanation of these results may be found in the facts given by Dr. Smith in the preceding extract.

2. Want of rainfall in India means a great change in the atmospheric conditions, together with increasing impurity of water sources, and dearer food, which, nevertheless, the sepoy has to provide for those depending upon him in the Madras Presidency. He can only do this in favourable seasons; but his pay "is not sufficient, even with compensation allowance, in seasons of dearth, such as the year "under review has been, nor is his pay in ordinary seasons sufficient to keep him in the con-"dition of an efficient soldier if it be spent in the maintenance of followers who overcrowd the "little hut and live like parasites upon its owner. . . . The remedy is largely in the hands of "Commanding Officers."

These facts, together with dearer food and climatic change, may account for the apparent rise in the death-rates of recent years. There has been a larger proportion of fatal cases of illness, although both admission and sick rates have been below the average.

3. The following were the chief admission causes during 1876:—

Diseases.	Total Admissions.	Admissions per 1,000 Strength.
Eruptive fevers	252	9·
Continued fevers	580	20·9
Malarious fevers	8,496	306·2
Rheumatic diseases	1,147	41·3
Diseases of lungs	711	25·6
Diarrhœa	801	28 8
Dysentery	833	30·
Eye diseases	870	31·3
Skin diseases	2,098	75·6

This abstract shows that no fewer than 10½ per cent. of the Native Army was in hospital with eye and skin diseases, and that a third of the Army was in hospital for fevers, chiefly of malarial origin. No account is given of the reasons why so large an amount of inefficiency arises from eye and skin diseases.

Dr. Smith calls attention to the fact "that sea-coast stations, and specially those on the west coast, "predispose to skin affections; climate and fish diet are probably the causes of this proclivity." But both classes of affections are not unusually results of some want of cleanly habits among troops. The subject merits inquiry.

The next abstract shows the death causes:—

Diseases.	Total Deaths.	Deaths per 1,000 Strength.
Eruptive fevers	2	·07
Continued fevers	5	·10
Malarious fevers	59	2·10
Rheumatic diseases	4	·1
Diseases of lungs	33	1·1
Diarrhœa	12	·4
Dysentery	14	·5

Referring to the influence of malaria, Dr. Smith says that malarial diseases probably caused half the mortality of the Army.

4. These abstracts, which are made up from the statistical forms in use, take no account of cholera; and information about this pestilence in a great epidemic season has to be sought for in the district or regimental reports, from which the following data are quoted.

Presidency District.—"During a year in which cholera prevailed epidemically and fatally to an "alarming degree in Madras and Vellore, it tells well for the general hygienic conditions of our "troops that only 22 men were seized with the disease, and 8 succumbed to it." The average strength present was 2,824, and if the cholera deaths took place solely in this number the death-rate would be 2·8 per 1,000.

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Northern District.—Out of a strength present of 2,627, there were 4 cases and 2 deaths = 0·8 per 1,000. On this low death-rate the Deputy Surgeon-General remarks as follows:—"Looking to "the extensive prevalence of this zymotic over the district, there is in the fewness of the cases which "have occurred among our troops incontrovertible evidence in favour of the general hygienic conditions "in which those troops have lived, however much in particular respects those conditions demand improvement."

Southern District.—Cholera prevailed epidemically throughout the circle. But out of a strength present of 3,257 there were 25 cases and 13 deaths among Native troops, equal to a death-rate of 4 per 1,000.

In the districts of *Malabar* and *Canara* there was no cholera among troops out of 1,962 men present. In an outbreak at Mangalore, 1 woman and 4 children, however, died of cholera.

Mysore Division.—Out of a strength of 3,235, there were 9 admissions from cholera and 4 deaths, 1 at Bangalore and 3 at French Rocks, equal to a death-rate of 1·2 per 1,000.

In the *Ceded Districts* there were 10 cholera cases and 4 deaths out of 1,520 Native troops.

The *Hyderabad Subsidiary Force* numbered 3,201 Native troops present, among whom there were 23 cases of cholera and 10 deaths, besides 10 deaths in families and 6 among followers. The reporter makes the remark that Hyderabad itself is nearly always "in a chronic state of cholera," and the remedy for such a state of things is not quarantine at Secunderabad, which, moreover, is stated to be impracticable, but cleansing and improving the city, besides improving the lines in Secunderabad itself.

Nagpore Force.—Out of 2,907 men present of this force 8 died of cholera.

There was no cholera among 2,713 men present in *British Burma* division.

There was very little cholera in *Saugor* circle, and only one death out of 2,865 men present. The Medical Officer of the 5th Regiment, Native Infantry, at Saugor, gives the following account of the cases in his regiment:—"The disease was clearly imported, and was often most fatal in the cleanest "places. . . There is no evidence to show that the water or air had anything to do with "propagating the complaint, but a good deal to point in the opposite direction." There is no proof given of these statements. They may both be correct, but cases of this kind are far too important to be settled by any such opinions. What we want are the facts. If the sepoys' families among which the cases took place had been visiting in affected localities, and were thereafter attacked, this fact should have been stated, or if the disease broke out in the lines after personal communication, the whole chain of facts should have been given in detail. And with reference to the assumed absence of any sanitary defects, this experience would have been very important had the lines been fully described. The remark appears to be called for, because at Banda, in the same division, there were three cases and one death in the lines of the 20th Regiment, Native Infantry, and the Medical Officer says: "The "cause, I am of strong opinion, was owing to the very dirty state of the courtyard of their hut. They "all lived in one hut; the disease did not spread."

An important fact is mentioned by the Medical Officer of the 33rd Regiment, 638 strong, stationed at *Dorundah*, in Bengal. There was an outbreak of cholera amongst the civil population residing within cantonment limits. Forty cases occurred, of which 26 were fatal. "The disease did not "extend to the sepoys or their families."

5. This comparative exemption from cholera in Native regiments during a great epidemic among other natives of the same country was very striking in 1876. The civil mortality was 9·4 per 1,000, while in Madras Native regiments it was 1·7 per 1,000 in hospital on the strength present. With these facts before him the Surgeon-General is justified in saying that they "prove what sanitation, even "when confessedly imperfect, can do towards warding off the attacks of that most fatal disease. . . "There are many preventable diseases which sanitation has yet to grapple with. The success of the "past is the best omen for the future."

6. The following abstract shows the relative prevalence of malarial fevers in the different divisions of Madras Presidency:—

Divisions and Districts.	Ratios per 1,000 Strength.	
	Admissions.	Deaths.
Malabar and Canara	88·1	·5
Presidency	104·4	·3
Southern	163·9	1·5
Bengal (Madras troops)	173·9	1·5
Ceded Districts	176·9	3·8
Mysore	179·9	2·1
British Burma	343·1	2·2
Northern	380·	4·1
Hyderabad	413·6	1·5
Nagpore Force	456·4	1·6
Saugor	620·	3·8

The proportionate liability of troops to malarial fevers no doubt varies from year to year, but it is impossible to overlook the significance of the year's facts. There must be some fundamental reasons for these diversities in liability to malarial fevers. Difference of clothing, or of living, or even of exposure, can scarcely account for them. And in all probability the causes must be sought in local climates, in the drainage of stations, and in the state of the sepoy's accommodation.

7. The following brief extracts from the regimental reports will show the nature of the facts under these heads.

Presidency District.—Accommodation for troops at Palaveram "very inadequate;" at Vepery and Vellore, "very faulty." Lines of 37th Regiment, Native Infantry, at Vepery, are "on low ground, "badly built, badly ventilated, and badly drained;" during the rainy season "parts of them under

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" water." There are similar complaints about the lines of the 14th Regiment, Native Infantry, at Vellore.

Northern District.—Left wing, 2nd Regiment, Native Infantry, at Sumbulpore. General drainage and conservancy in the lines defective. V-shaped drains imperfectly joined, and permit soakage. The drains open into reservoirs at the west end of the lines. These also are a nuisance overflowing the ground, "causing contamination of a well within a few yards of the lines." The whole drainage question has been repeatedly represented to the proper authorities.

Berhampore.—" Ground on either side of the road is cut with shallow channels, for the purpose of " carrying away surface water. In these cutcha channels are sunk, opposite to each hut, an earthen " tub for holding sewage from each individual hut; sewage daily baled out, and conveyed away some " distance from the lines" (a safe enough method, if properly carried out). "But frequently these tubs " overflow, and the contents run into the cutcha drains, and either soak into the ground or are " evaporated by the heat and diffused into the air. Sepoys' compounds constantly damp, and the " sewage percolates freely into the soil."

Lines of the 7th Regiment, Native Infantry, at *Vizagapatam.*—Drainage very bad; "all the " sewage and impurities must naturally percolate into the loose sandy soil on which the huts are " built."

Cuttack.—Drainage of line requires immediate attention, or a still better step would be to remove the lines.

Southern District.—The lines of the 39th and 32nd Regiments, Native Infantry, at Trichinopoly, are said to be badly drained, and the water channels permit of contamination of the subsoil.

Mysore Division.—Surface drainage at Bangalore is generally effected by V-shaped masonry drains, but there are exceptions where only surface cuts are used, as in the case of the 23rd Regiment, Native Infantry. In certain cases the V-shaped stone drains allow the fluid to percolate at the joints.

At Mercara, the huts are situated in a deep hollow, in the bottom of which is a marshy swamp, " from which a dense malarious fog rises nightly." The surface has been levelled and drained, but this is done by cuts in the earth, "torn into holes in the monsoon, and become cesspools from soakage " of sewage matter in the dry weather." There is a dirty village in the hollow besides the lines. The death-rate among troops was 29·7 per 1,000 in 1876.

Ceded Districts.—At stations in these districts the lines are drained by surface earth cuts.

Hyderabad Subsidiary Force.—The surface drainage of Native lines in Secunderabad is of the same general description. They are apparently only surface cuts, and the floors of some huts are much below the surface of the ground. The lines of the Sappers and Miners are in this state, and in 1876 their death-rate was 34·2 per 1,000. The Medical Officer says that "the dampness of the locality " and the construction of the huts appear to have a prejudicial effect on the health of the men."

In the *Nagpore Force* the drainage of lines is said to be very indifferent. At Kamptee, "during the " rains, and for some time after their cessation, the floors and walls of the huts are very damp from " the retentive nature of the subsoil. . . At present the Native lines are without any system of " drainage, and year by year the ground must become more saturated with organic impurities."

Similar statements are made about the drainage of Seetabuldee and Hoshungabad, but as regards the amount of fever at the latter station, the Medical Officer remarks that "climate can hardly be " considered as playing the chief part in the causation of this ailment, when the insanitary and humid " condition of the subsoil of the station, the bad housing, want of proper warm clothing, insufficient " and non-nutritive food in many instances, and the fact that the men and their families generally " sleep on their mats spread on the cold ground, doubtless saturated, as well as the walls, &c., of the " building, with moisture, by the rise of subsoil water by capillary attraction, is borne in mind." The total death-rate at this station was 26 per 1,000.

The following facts are stated about the drainage of Native lines at Raipore:—" In the double " rows of huts the latrines are placed near the division walls between the compounds, and in 394 " compounds so situated there is no escape for any portion of the urine and latrine washing water " outside, and therefore it must all soak into the floors of these compounds. In the remaining 315 " compounds, where the drains of the latrines communicate with the drains outside, a portion of the " urine and latrine washing water escapes outside."

The facts regarding the left wing, 16th Native Infantry Regiment, at Jubbulpore, may be here cited as illustrating the effect of better sanitary conditions on health. Out of an average strength of 652 present, the admissions in 1876 were 582 per 1,000, the daily sick under 2 per cent., and the death-rate 1·4 per 1,000. The Medical Officer states that he is inclined to attribute the improvement to three causes: 1st, favourable climate during the year; 2nd, purchase by the men of better food and warmer clothing; 3rd, the men having become as it were acclimatised. Other local conditions are reported favourable, except the water, which is stated to be "very bad" in quality.

8. So far as the evidence goes it appears to show that to damp subsoil of stations especially around and under sepoys' huts, together with the material used and the mode of construction of huts, must be attributed the principal causation of paroxysmal fevers, at least within the lines. The facts under these heads appear to show (as often pointed out) that mere surface cuts are insufficient for drainage purposes, and that the rainfall ought to be passed away from the lines by impervious shallow surface channels.

The need of better lines at many stations is obvious, but it seems probable that much good might be done by the men themselves, if they were taught the benefit of raising the floors of huts above the ground level, and sleeping above the level of the floors. The Surgeon-General states that "in the " several reports from executive Medical Officers attention has been called to the condition of " the lines, and various improvements suggested. In many cases the sites are bad, in others unhealthy; " in many the lines are overcrowded, and in most the huts are badly ventilated, the drainage " defective, and the soil polluted." But it is at the same time satisfactory to be informed that "from " year to year the pressing subject of sanitation is engaging the attention of authorities, civil, military, " and medical. The progress made may not be rapid, but it is satisfactory. The principles of the " science are well understood and their value acknowledged. The principal want is that of funds. It is

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" a matter of difficulty to remedy the defects of old huts, of old lines, and of objectionable sites. Some-
" thing may be done, and is being done, but in many cases entire reconstruction alone will meet the
" requirements of the case."

9. *Water-supply.*—No chemical account is given of the water used by Native troops. It is generally reported as good and sufficient, but at some stations both quality and quantity are materially influenced by atmospheric conditions.

The station where improvement in this prime element of health is most dwelt on is Secunderabad, where it is stated that "on account of the scanty rainfall the water-supply in all the wells in the " regimental lines, as well as those in the cantonment, has been very deficient, and may be expected " to be very much more so as the season advances. Means have been taken by deepening all wells " to improve the supply, and in some instances with success. But until some scheme is adopted to " supply water from the Hoosain Saugor tank to the town of Secunderabad in seasons of drought, a " like scarcity will always exist." Whether this tank is the best source of supply would of course be subject of careful inquiry, but the facts may be received in proof that the health of troops (so far as water is concerned) at this large station depends upon the amount of rainfall, and that no sufficient provision has hitherto been made to provide the lines with wholesome water. It may, moreover, be asked whether to this want is not to be attributed some of the cholera and enteric fever mortality at this station.

10. (1.) The facts regarding the comparative exemption from cholera of Native troops during a great epidemic among the civil population appear to justify the opinion of the Surgeon-General already cited as to the effect of even imperfect sanitation in diminishing the intensity of cholera, while the reports themselves show that much good has been done in attention to conservancy and general sanitary improvement of lines.

(2.) That, nevertheless, the great prevalence of paroxysmal fevers, and the account given in the reports of the state of the drainage of lines, huts, and compounds, and the habits of sepoys of sleeping near the ground level, appear to point to the necessity of providing better surface drainage by shallow sectioned impervious surface drains, and improving huts and compounds, as a necessary step in reducing the amount of these fevers.

(3.) That the water-supply of Secunderabad and other stations where deficiency exists in dry weather should be improved as soon as possible.

(4.) It is scarcely necessary to enter into further details of sanitary condition at these Native stations. The cardinal defects are evidently those connected with the drainage of lines and compounds, and structural defects in the huts themselves. If the conservancy arrangements are well attended to, and lines and compounds kept clean, while the drainage defects are remedied and the huts improved in cases where new lines are not contemplated, it may be safely predicted that Native troops will continue to enjoy comparative immunity from epidemics, and that the chief inefficiency causes, namely fevers, rheumatic affections, and bowel diseases, will soon show a marked reduction in amount.

4th June 1878.

No. 17.

MEMORANDUM of the ARMY SANITARY COMMISSION on the MEDICAL HISTORY of the NATIVE ARMY of BOMBAY for 1876.

This Report is made up chiefly of departmental detail, but it nevertheless contains a few points which appear to call for attention.

1. The average daily strength of the Bombay Native Army for the year under review was, in round numbers, 22,583. From among this number there were 26,918 admissions to hospital, or 1,192 per 1,000 of the strength. The average daily sick in hospital amounted to 37·9 per 1,000. The total deaths were 296 (247 in hospital and 49 out of hospital), yielding a death-rate for the year of 13·1 per 1,000, the highest rate (except in two years) of the last seven years.

The ratios of mortality in the different divisions of the Presidency were as follows :—

	Strength.	Deaths per 1,000.	Daily Sick per 1,000.
Poona	7,448	5	29
Northern	8,937	7	41
Presidency, Aden, &c.	3,207	14	39
Sind	2,999	31	47

None of the sick ratios are very high for India. The higher Sind rate was due to malarial fevers, and the increase of deaths in this division in 1876 is stated to have been due to an outbreak of cholera in the Sind frontier field force.

2. The most prevalent diseases were as usual malarial fevers, from which there were 12,528 admissions for the Presidency. When apportioned among the divisions, the per-centages of malarial fevers out of the total cases treated were for—

Poona	41·2 per cent.
Presidency	43· „
Northern	44·6 „
Sind	54· „

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All these ratios exceeded those of the preceding year. Deaths registered as due to these fevers were 44, nearly 2 per 1,000 of the strength and 3½ per 1,000 of the cases.

The most severely affected corps were those stationed at Poona and Mehidpoor. At the latter station, out of a strength of 378 there were 734 cases of fever, nearly 67 per cent. of the total admissions at this unwholesome place. There was, as usual, a large amount of malarial fever among troops in Upper Sind arising from well known local causes there.

3. *Cholera.*—This disease existed in all the divisions. There were 112 cases treated, of which 53 proved fatal. The weight of the mortality fell on the Sind frontier force while on field service. This outbreak appears to have been connected with the accidental use of impure water and other causes.

4. *Respiratory diseases* gave rise to 1,493 admissions and 55 deaths, more than half of which were due to the cold variable climate of the Upper Sind, where pneumonia prevailed among the troops.

5. *Scurvy* yielded 203 admissions, not a large number when compared with other diseases, only there should be very few admissions from this affection in a well administered army.

6. There were 1,588 admissions from *rheumatism*, and 1,517 cases and 18 deaths from *bowel diseases*. There were likewise 136 cases of *guinea worm*, an affection resulting from the use of bad water.

7. On the general question of sanitary condition Dr. Hunter, Acting Surgeon-General, makes the following statement :— "In all the divisions the arrangements for the cleanliness of regimental lines "have been carefully carried out; there has been no overcrowding; the ventilation, conservancy, and "general sanitary state have been attended to as fully as the numerous more or less permanently "faulty conditions of the lines will admit of. The improvement most urgently needed is proper "drainage. There is little doubt that, were a complete system of drainage carried out in the lines "and cantonments, the present amount of sickness from malaria would be surprisingly lessened." "As a rule, the water-supply is pronounced by the Medical Officers to be good and abundant. But "few of the samples have been examined. The necessity which exists for a full and complete standard "analysis of the water used at the military stations of this Presidency has been more than once "brought to the notice of the Government within the last year. That in many cases the water-supply "needs improvement is but too evident."

The Acting Surgeon-General calls attention to the defective diet of the sepoys where they have large families to provide for, and the want of fresh vegetables as a cause of scurvy, especially at Aden. Inefficiency from badly fitting boots is still complained of, and "as yet, however," he says, "nothing "appears to have been done towards effecting improvement in this direction." The want of suitable warm undress clothing is also complained of, especially in Sind, where the climate is so variable.

8. The regimental reports afford some instructive detailed information about local disease causes, much of which has been again and again referred to in the Memoranda of the Army Sanitary Commission, but the facts are nevertheless reproduced.

For instance, the Medical Officer of Her Majesty's 20th Regiment, Native Infantry, stationed at *Bombay*, reports as follows :—

"The locality of the lines is very bad; they are situated in the vicinity of a thickly populated "district, and on ground occupied in like manner for a long period and saturated with rottenness; "moreover, they are close to an abominable depôt of filth, the effluvium from which is perceptible and "most offensive at times throughout the eastern division of the lines." The floors of the huts are described as all more or less damp during the monsoon rains. "The surface drainage of the lines is "very defective."

It is stated that none of the drains are trapped (a precaution which would be of little use except the drains were flushed and ventilated), "and there is to be seen and smelt a mass of seething filth at these "apertures." There are cesspools in use in many instances.

The foul vapours produced by this state of matters surround the hospital in still weather.

The cells are so bad that prisoners undergoing sentence have had to be removed to hospital to protect their health.

Commenting on this statement, the Deputy Surgeon-General says that "the sanitary surroundings of "the regimental lines are of the worst description; they have, however, been so frequently reported on "as not to call for further notice." It is nevertheless the duty of this Commission to urge that the responsibility for this state of matters should be brought home to the proper quarter. The most inexcusable part of the neglect must apparently rest on the Bombay Municipality, and it may be suggested whether, in the interests of the public service, they ought not to be called on to abate all the nuisances connected with the state of their drainage arrangements without loss of time.

Last year the admissions to hospital on an average strength of 594·5 of the 20th Native Infantry were in the ratio of 1,214 per 1,000, and the deaths in hospital were 23½ per 1,000, although the hospital is exposed to a sea breeze. Besides these results to the health of the 20th Native Infantry Regiment, the Medical Officer in charge of the Marine Battalion regrets to say that remittent fever, of a low and not unfrequently of a typhoid type, is largely on the increase in this corps, due, he thinks, to the use of unwholesome food, but also "to the closeness of the lines to the Sonapore outlet drain, which "becomes most offensive as soon as the northerly and westerly winds begin to set in; and as long as "the wind continues to blow from the north of west and east, which brings the lines to the leeward of "the drain, these fevers are observed to be most prevalent."

9. *Poona.*—The Medical Officer in charge of Her Majesty's 1st Regiment, Light Cavalry, complains of the defective construction of Native lines. Want of ventilation; floors in very many huts a foot below the outer ground level; want of cleanliness in back-yards; and generally "the evils are "of such a nature that nothing but the removal of their causes, which will involve the demolition of "these viciously constructed habitations, will produce the desired result." There is no proper system of drainage throughout the Cavalry reservation. There are sufficient natural facilities, but advantage is not taken of them. In the horse lines the ground gets saturated with filth, and the state of the surface in wet seasons is sufficient to account for the spread of the disease.

This subject has been placed in the hands of the Sanitary Commissioner, and it must be hoped that a speedy remedy may be applied. There must be something very wrong with the sanitary arrange-

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ments of Poona station to account for the fact stated by the Medical Officer, viz., that out of a strength of 589 men there were 1,106 admissions to hospital, of which no fewer than 779 were cases of ague. It is possible that climatic causes in connection with clothing and deficient dietary may have had something to do with this fact. Any way, its causes ought to be sought out and dealt with.

It may be useful to add the following details of these ague admissions:—

Men.		Cases.
234	men once in hospital	234
88	„ twice	176
66	„ three times in hospital	198
26	„ four „ „	104
8	„ five „ „	40
2	„ six „ „	12
1	„ seven „ „	7
1	„ eight „ „	8
426		779

All the men, except 163, were thus in hospital for ague during the year. But there was not a single death during the year.

The Medical Officer of the 8th Regiment, Native Infantry, at Poona states that the lines are drained by open drains which he thinks liable to soakage, and to prevent such a result he proposes that the drains should have an impervious lining. But, he says, he has been informed that the present intention is to have the drains dug up at certain intervals.

As this point has been again referred to, we must, on the facts as they stand, concur in the opinion of the Medical Officer.

There should be no surface cuts for conveying away water within lines except on steep inclines. All surface drains should be rendered impervious to soakage. Otherwise their direct tendency is to render the subsoil damper than it would probably be without them.

In this regiment there were 631 admissions from ague and 7 from remittent fever out of a strength of 684 men.

The Deputy Surgeon-General attributes the sickliness of the regiment to defective dietary incommensurate with the work the men had to do in building their lines, aided by climate. But it must be borne in mind that suitable work has long been known as an effective means of improving the health of troops,—only effective work pre-supposes suitable food.

The best remedy against climatic causes is warm clothing, especially after work.

10. The importance of this last precaution is very properly insisted on by the Medical Officer of the Poona Horse at Sirur, who says that the physical condition of the district is not that supposed to be conducive to malaria.

"There were indeed only 92 cases of ague out of a strength of 314, and those who are careful to guard "against sudden chills are seldom or never affected with a paroxysm, indeed I ascribe fully two-thirds "of our sickness from ague to neglect, avoidable or otherwise, of this precaution." "If," he says, "the "men on coming heated off parade wiped the perspiration from their bodies and changed their clothing, "intermittent fever would be very rare among them." Unfortunately, however, the men have not the means of doing this, and they suffer in a dry climate, where, moreover, the temperature is sometimes at 38° F. in the shade. There is nothing new in this. It is a matter of common knowledge that when men have been exposed to malaria they are always liable to attacks from climatic causes after they have left the malarial district. What is really required to meet such cases is a reconsideration of the whole question of clothing troops in India, as we have often advised.

11. The Medical Officer of Her Majesty's 15th Regiment, Native Infantry, at *Ahmednuggur*, calls attention to a filthy practice in use in the hospital there, which it was thought had long been discontinued in Indian wards, namely, cow-dunging the floors. In the present state of sanitary knowledge such a custom is not only indefensible but requires pointed condemnation. The Medical Officer says, very justly, that this abominable practice is simply "plastering dirt over dirt," and he proposes paving the floors instead, which ought always to be done. Even digging out and removing the earth at short intervals, and replacing it by fresh rammed earth with some powdered quicklime in it, would answer in cases where the arrangements were of a temporary character. Any way, the worst that can be done is the course described as having been followed in the present case.

12. *Asseergurh.*—Several important points regarding the water-supply of the fort which are raised in the report of the Surgeon in charge of Her Majesty's 4th Rifles, Native Infantry, on detachment there, may be here discussed on account of their bearing on the water supplied by tanks, of which there are four in the fort. One of these, the "Mamoo Banja," was cleaned out last year at a cost of 2,600*l.* There were 2,000 workpeople employed on the cleaning, day and night, for about two months, and mud to the depth of 24 feet was taken out of it, till the stone floor of the tank was reached. Three analyses of the water are given, one before and two after the cleansing, the essential points in each case being as follows:—

	Before Cleansing.	After Cleansing.	
		No. 1.	No. 2.
Grains per gallon:			
Total solids	14·0	12·60	11·90
Chlorine, parts per million	1·07	1·50	1·93
Free ammonia	·53	·46	1·06
Albumenoid ammonia	·60	·40	·72

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The albumenoid and free ammonia are in considerable amount in both waters, but when compared with the amount of chlorine it is doubtful whether they are altogether of animal origin. It is probable that the impurities are derived from atmospheric dust and washings of the collecting area, and possibly from ground which had been fouled at some former period. There are, it appears, houses within the area supplying the tank, from which there is a possibility of contamination. On the other hand, from the isolated position of the fort, it is not likely that a better water-supply is available, and the amount of drinking and cooking water required for some 200 men cannot be very great. In the absence of local knowledge of the tank and its surroundings, it is only possible to state the following points as suggestions towards improving the quality of the water :—

(1st.) The collecting area must be preserved from contamination by men and animals.

(2nd.) Any area which cannot be so protected ought to be cut off by means of impervious surface drains, and the rainfall turned away from the tanks.

(3rd.) Any houses from which impurities might come should be removed, or their drainage cut off from the tanks.

(4th.) If wells are sunk to be filled by water from the tanks, care must be taken to see that they are dug in clean ground.

(5th.) If such wells do not yield water of sufficient purity for drinking or cooking it would be necessary to provide filtering arrangements to supply the required amount of water for these purposes on the principles laid down in our note on the filtration of water given in our Memorandum on the Report of the Sanitary Commissioner with the Government of India, and printed in Vol. IX. of the India Office Sanitary Reports.

13. *Sattara.*—The Deputy Surgeon-General says that the huts for sepoys at this station are "crowded, ill-ventilated, and in so dilapidated a state as to render them wholly unfit for human dwelling." They require entire reconstruction. The Medical Officer of Her Majesty's 4th Rifles at this station complains that the water-supply is "certainly most inadequate" for part of the year, and demands "most serious "attention," the quality is also bad.

14. *Belgaum.*—The latrine arrangements at the lines of Her Majesty's 2nd (Prince of Wales' Own) Grenadier Regiment, Native Infantry, appear to be in a very unwholesome state, little better than cesspits infecting the air and subsoil. It is stated by the Medical Officer that several cases of cholera were traced to the use of water from a well 17½ yards from the male latrine, "the water having become "contaminated with liquid sewage which found its way by percolation into the well." The whole of this is quite inexcusable. Some one must be held responsible either for digging the well near the latrines or for building the latrines too near the well, and should be called to account. Year after year the Commission has to call attention to cases of this kind, in which the most obvious sanitary principles have been overlooked.

15. A similar instance is quoted by the Medical Officer of Her Majesty's 19th Native Infantry Regiment, at *Sholapur*, who says he believes that "the water of one of the line wells, which is situated "almost immediately below the male latrines, is very liable to be contaminated through soakage from "them."

16. *Dharwar.*—In our Memorandum on the Health of Native Troops in Bombay Presidency last year attention was called to the opportunity afforded by the new lines at this station of observing the influence of favourable local conditions on health. The present report continues the information, but the statistics of troops on detachment duty are not distinguished from those of troops at Dharwar.

The total average strength of the 12th Regiment, Native Infantry, was in round numbers 642, but of these 265 were on detatchment duty at five different stations, and so far might have been exposed to less healthy conditions. Taken over all, the results to health were as follows :—

Average strength	642
Total admissions	303
„ deaths	4
Admissions per 1,000	472
Deaths per 1,000	6

The general result contrasts favourably with those obtained at other stations, although the Medical Officer considers that the men were severely tried in building the new lines, during which they received neither money nor rations, *i.e.*, additional food to enable them to bear the labour in a dear year.

17. *Deesa.*—A remark of some practical importance is made by the Deputy Surgeon-General on the sanitary arrangements of Her Majesty's 2nd Regiment, Light Cavalry, at this station. He says, the sewage from family quarters is collected in vessels placed outside the door and removed daily, and that this is the only instance in which any organised arrangement exists for the removal of sullage from Native lines, which is elsewhere left to soak and pollute the ground, and the example, he says, is highly commendable, and decidedly deserving of imitation in the interests of health. Its real importance consists in the fact that this, which is a perfectly safe system of dealing with house sewage, has been carried out successfully, and it follows that it can be carried out elsewhere and in other Native lines. It would be very desirable to call attention to the practice, with a view to its being more generally adopted.

The lines of Her Majesty's 18th Native Infantry at this station are described by the Deputy Surgeon-General as "old, dilapidated, and repeatedly condemned. Many of the huts are leaky, and all are "damp in the rains, the floors generally being below ground level." In other respects the general sanitary condition of the lines was favourable.

18. Similar complaints are made about the bad state of the lines occupied by Her Majesty's 23rd and 25th Native Light Infantry at *Mhow*. The Deputy Surgeon-General describes the lines of the former of these regiments as "unsatisfactory, particularly in the exceptionally narrow streets, and the huts "have the usual defects of want of plinth, inadequate ventilation, and restricted cubeage ; the floors are "damp in the rains." The complaints are similar as regards the lines of the 25th Native Light

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Infantry. In this regiment, the chief causes of sickness are stated to be "malarious fever and "bronchitis," "their principal causes were malaria and cold acting on underfed, badly housed, over-"heated, and over-exhausted (as in the cases of tile turning and lines repairing), and lastly, badly "clothed men."

We must again repeat, however, that work has no necessary connection either with malarious fever or bronchitis.

The other causes mentioned are those requiring to be dealt with. But the hazardous state of the water-supply must not be overlooked in this enumeration of removable disease causes. The following is the account of it given in the report:—

"It is derived from three wells belonging exclusively to the regiment (the 25th Native Light "Infantry), and a fourth well which is used by men of both the Native regiments. They are all "situated between the lines and the permanent latrines."

"The Mochees well is very near the latrine of the 23rd Regiment and furthest from the lines, and "does not yield very pure water." "The Parwaree well is again very near the hospital latrine." We have already expressed our opinion on this want of care in selecting positions for wells and latrines. There is no doubt that a careful examination would show its direct causative relation to outbreaks of disease at not a few Indian stations.

19. *Mehidpur.*—In a special Memorandum on this station sent to the India Office on the 8th August 1877 attention was directed to the unfortunate results of placing the lines in a swamp, while a better site might have been had. The site had been partly drained, with an apparent reduction in the total disease admissions, in 1875. But the present report shows that no real improvement has taken place in the health of Her Majesty's 10th Regiment Native Light Infantry stationed there. In 1876 the average head-quarters strength was 378, out of which there were 1,074 admissions to hospital, *i.e.*, the whole strength passed through the sick wards between 2½ and 3 times in the year. Among the admissions were 720 cases of ague and 14 of remittent fever = 1,940 per 1,000 strength. The fever is of a severe character, and gives rise to consequences long after the attacks at Mehidpur. This additional year's experience almost removes any hope of further improvement of this station. Such at least is the view of the Medical Officer of the regiment, who says that the station, "despite "every sanitary effort made in the direction of general surface drainage, roads, lines, food, water, "removal of vegetation, &c., it must be said continues still a very focus and hotbed of malarial "disease." And he urges the removal of the lines to an elevated healthy site close at hand. The selection of the present site was the result of a mistake, and if the subsoil water cannot be removed to a sufficient depth to dry the ground, the only thing to do is to remove the lines, or as a temporary expedient to shift the regiments at brief intervals. It may be suggested whether camping out on the more elevated site during the fever season would not be of use. A few irregular cavalry are always stationed on this ground, and they are said seldom or never to suffer from fever. Commenting on this report, the Deputy Surgeon-General says that the health of the troops has been "most unsatisfactory," and their sick-rate "nearly double that of other corps, the result of lowness of site, bad drainage, bad "water, and dearness of food."

20. The results of service at Mehidpur follow the troops elsewhere. The *Augur* report states that the principal cause of the large number of admissions from intermittent fever there was that the men had been "located for the previous year in the very malarious station of Mehidpur, at which station "every regiment suffers severely from malarious fever at all seasons of the year, and the men's system "is so saturated with the poison that from time to time they get renewed attacks." So far as the efficiency of Native troops is concerned, these yearly recurring statements show how costly has been the mistake of placing this station in a swamp. Augur is a comparatively healthy station.

21. *Neemuch.*—There are few facts stated in the regimental reports from this station, to which attention may be called.

The Medical Officer of Her Majesty's 3rd Queen's Own Regiment, Light Infantry, gives the following analyses, made at Bombay, of the military well water, which appears to throw some light on the sanitary history of this station:—

Military Wells.

Analysis of Government Analyser.

Cholera Year 1875.	Grains per Gallon.		Grains per Gallon.	
	Total Solids.	Chlorine.	Free Ammonia.	Albumenoid Ammonia.
Royal Artillery:—				
Well No. 1 - -	39·20	3·97	·0065	·0021
„ No. 2 - -	76·30	12·42	·0009	·0042
„ No. 3 - -	49·70	5·46	·0018	·0063

Unfortunately, no account is given of the wells or their surroundings, but the following remarks on them are made by the Medical Officer of the 3rd Queen's Own, Light Cavalry:—

"These waters were all considered to be good in the Government Laboratory, Bombay, and at "Neemuch itself. The bazaar wells and river water were considered to be only fair, and to require

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" filtering. Yet the regiments (European especially) suffer much more in proportion, and in severity, " from cholera (every three to five years), than the inhabitants of the bazaar." The Royal Artillery has suffered severely from both typhoid fever and cholera. To what extent has the use of these waters contributed to the result?

In the first place, as long since pointed out both by this Commission and by the Government Analyser at Bombay, little or no useful sanitary information about Indian waters can be obtained by sending samples hundreds of miles away to be analysed. The work to be of use must be done on the spot. What these analyses informs us of, however, is not unimportant. Taken as they stand, they afford strong grounds for suspicion that the subsoil water supplying the wells passes through strata polluted with recent as well as with old sewage matter, as shown by the amount of chlorine, while the amount of solids in all the wells, but especially in No. 2, ought to lead to the rejection of all these wells as sources of drinking and culinary water, unless (on the supposition that the waters are not otherwise polluted) no better water can be got.

In order to solve the question, it may be suggested that a minute inquiry should be made into the state of the subsoil in the vicinity, especially in regard to old sources of sewage pollution, and that the wells should be emptied and cleansed, and the fresh incoming water examined. It may be safely predicted that so long as these waters are used, especially by European troops, will the past experience of typhoid fever and cholera be reproduced, unless the suggested inquiry should lead to the discovery of removable sources of water impurity.

Another source of danger was apparently the position of the latrines, which were too close to the barracks of the Royal Artillery.

The 3rd Cavalry lines at this station are so low and wet that " water actually seemed to rise from the " ground." As regards the lines of Her Majesty's 24th Regiment, Bombay Native Infantry, at this station, the Medical Officer says that " they are bad in every respect."

Improvements in drainage were, however, being carried out in some portions of the station.

22. There is little information about *Nusseerabad* in the present Report, except that out of a strength of 623 men of Her Majesty's 16th Regiment, Native Infantry, there were 1,140 admissions to hospital; 730 of these were due to intermittent fever, about 20 per cent. of which merged into a low form of remittent.

The regiment marched to Delhi in November, leaving above 100 fever cases in hospital. At the date of the report the regiment was described as "in a very weak state at present, owing to the large " number of men who have suffered from fever," " unfitting a man for service two or three months " at least."

In former Memoranda attention has been repeatedly called to the defective sanitary condition of Nusseerabad, and this the latest experience appears to show that little has yet been done to cope with it.

23. Of the stations in Sind Division, *Jacobabad* still retains its unwholesome character, and all the troops there have suffered severely from fevers. There is nothing new to state about the local causes, as they are well known and very difficult to grapple with. The whole country is below the river water level, and, consequently, there is no known drainage outlet, and the superabundant water evaporates. The ground is damp or wet throughout, and, as no special constructive arrangements have been made to meet this condition, it is not surprising to be told that "the walls are damp for " two feet from the floor," and that the ground under the lines is damp throughout.

The facts fully account for the Medical Officer's statements that "malaria has been worse than " usual during the past years;" that the general health and physique of the men has been "most " unsatisfactory;" that "the numerous chest and throat affections are sufficiently accounted for by " the dampness of the lines, and that the general health of the men during the year has been very " bad."

Localities such as this can only be dealt with in two ways. Either there should be some outlet sought and used for lowering the subsoil water level under the surface to a sufficient depth to keep it dry, or if there be no such outlet possible, any buildings intended for human occupation should be raised sufficiently to escape the influence of ground moisture.

24. The last reports in the present volume give a medical history of the force sent to Khelat including the details of an outbreak of cholera among the troops. There were 908 fighting men, 576 Native followers, and 21 Punjab Police. Among the fighting men there were 96 cholera cases and 46 deaths. The camp followers yielded 38 cases and 21 deaths, and the Punjab Police had 3 cases and 1 death. The marches were made through a country where cholera had already appeared, and the troops were exposed to risk from this cause, as well as to the use of impure and doubtful water, fatigue, and also to the climatic changes of a country elevated considerably above the plains of India.

There is nothing special or calling for remark in the facts of the case.

25. These reports on the medical history of the Bombay Native Army for 1876 appear to show that, although some progress in improving Native stations has already been made, several of the complaints are of a serious nature and ought to be vigorously dealt with, but they are fewer in number and classify themselves under the following heads :—

(1.) Pointed attention ought to be called to the condition of the Native lines in Bombay itself, where the evils complained of appear to be directly the result of the present state of the municipal works. Improvements appear to be required at Poona and a number of other stations. The principle to be kept in view in surface draining stations may be re-stated as follows. No surface drainage lines are of use which do not afford immediate facilities for the flowing away at once to the outlet of all rain water entering them. Hence, except on steep inclines, mere cuts in the ground do no good, and may do harm by water-logging the subsoil through infiltration of water by the cutting. The best surface drain is of a shallow saucer section, made of the most impervious material at hand, care being taken to keep the drain clean and in thorough repair.

(2.) Connected with the subject of drainage is the condition of the lines and huts. It is a simple elementary truth that in a malarious country no hut is fit for human habitation, and especially in an

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army where vigorous health is essential to efficiency, of which it can be said, as in these reports, that the floors are damp, and that the damp can be traced for two feet up the walls. No evasion of the result to health is possible. The description of these huts is nothing more than a statement, in other language, of the amount of fever among the troops in occupation. The only way of remedying the evil, so far as it is remediable with existing lines, is, in some way or other, to make walls damp-proof at the ground level, and to raise the interior so that men may live and sleep, as far as practicable, above the ground, but whenever new lines are to be constructed the floors should be raised above the ground level on posts, as in Burmah.

(3.) The question of water analysis is again reproduced in these reports. It appears that the real condition of the water-supply is scarcely known at any one Bombay station. Water samples, analysed at a distance and in the absence of knowledge of the surroundings of the source, give little information on the sanitary state of the supply.

(4.) Again, what excuse can be urged for the carelessness of placing latrines and wells in such positions with regard to each other that the filth soaks into the ground, and thence into the well? A well derives water from the entire *rayon* which it can drain, the area being determined by the relation which the depth of the well bears to the nature of the subsoil and the direction of the stratification. A first principle of well water supply is to keep this area around the well free from all sewage of men and animals, and the readiest way to expose troops to attacks of cholera and typhoid fever is to dig latrines and place dung-heaps within them. It seems scarcely necessary to urge these considerations, were it not that the present reports show the extent to which they are still unrecognised in practice. In all Native lines any method of dealing with the latrines should involve the principle that none of the latrine matter is allowed to touch the earth surface. The use of moveable vessels, as at Deesa, or some similar procedure, should always be adopted in stations where proper sewerage and drainage do not exist.

(5.) In the present Report the question of clothing in its relation to recurring attacks of fever has again been brought forward. All the Commission can do is to suggest that the subject requires consideration by the authorities, especially at stations subject to low and variable temperatures. Flannel or woollen should always be worn next the skin. So far as regards boots, it can only be repeated that inefficiency from bad-fitting boots is inexcusable.

These are the chief points bearing on the health of troops to which attention may be directed in the present year's reports.

26th February 1878.

No. 18.

MEMORANDUM of the ARMY SANITARY COMMISSION, on CORRESPONDENCE relating to the working of LOCK HOSPITALS in INDIA.

These papers contain the results of an inquiry into the measures in force for diminishing the amount of venereal diseases among British troops in India, called for by the Government of India in consequence of the remarks made by the Army Sanitary Commission on the apparent partial failure of lock hospitals in that country.

There is nothing new in the facts elicited by the inquiry. The Contagious Diseases Act, and lock hospitals, together with registration and periodical examination of prostitutes, have been in operation for many years, and, nevertheless, the amount of disease among British troops, according to the latest returns, those for 1876, show the following average results:—

Admissions. Ratios per 1,000.

	Primary Cases.	All Cases.
Bengal - - -	188	218
Madras - - - -	179·2	210
Bombay - - -	179·5	208

The whole subject has been so fully discussed year after year that it is scarcely necessary to do more than adduce these ratios for 1876, and to see whether the present papers afford any further light on their causes, or on the means of reducing them; because, making allowance for particular views which may be entertained by Officers and others engaged in carrying out the Acts at specific stations, there cannot be the slightest doubt that the general results have not been altogether satisfactory, and apparently justify the opinion expressed by the Sanitary Commissioner with the Government of India, and adopted in the present papers by the Surgeon-General and Principal Medical Officer, British Forces in India, that, "whatever view may be taken of the question, it is evident that the rules for the prevention of "venereal diseases amongst European troops have in a great measure failed, and the results have "fallen far short of what was anticipated."

The most common cause of this want of anticipated success assigned in these papers is not one directly connected with the working of lock hospitals, but with the moral condition of the people. Whatever may be done by Government for bringing under rule a certain portion of professed prostitutes, and treating them in hospital when found diseased, there will always be outside of all such rules a great number of poor women who tempt the soldier when and where they can, and there is every reason to believe that a large part of the syphilitic disease among troops is due to cohabitation with this class. They present themselves everywhere. Not unfrequently they are employed in various ways within

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cantonments, and even within barracks, a custom which there ought to be no difficulty in putting a stop to. Wherever the soldier goes for recreation or exercise he may meet them, and the evil has, no doubt, been increased by large groups of population having grown up within former cantonment limits.

These inferences appear to the Commission to be warranted by the facts in the papers, and as a consequence it appears to follow that in future a main remedy to be relied on must be found in police regulation. If these clandestine prostitutes cannot be brought under the operation of the Contagious Diseases Acts, the only other remedy appears to be to keep them out of cantonments and to exercise a more strict supervision over the troops. This aspect of the evil is stated as follows in the Lucknow report:—"Pursuing their avocations in cantonments are numbers of Kunga women, goat-keepers, ayahs, " *et cum multis aliis*, who offer themselves ready victims to the seductions of the careless heedless warriors. " Employed in the Military Department of Public Works are women and girls whose occupation in " the construction of new barracks, &c., leads them almost into the very arms of the soldiers." And again: "Closely surrounding the cantonments on every side is land under cultivation, the labourers in " the fields being in many cases women deeply poverty-stricken, who for a few pice readily yield " themselves to the soldiers."

The Medical Officer states that the registered women at this station are "singularly free from " disease," and nevertheless the admissions from primary syphilis and gonorrhœa in 1876, to the exclusion of all other venereal affections, were 257 per 1,000 strength. The year before the ratio was 311, and, as if to prove how variable these primary attacks are, the ratio in 1873 was 127 per 1,000. The facts appear to show that the causes of infection must in this case be sought outside the register. But while they appear to point in the direction of strict regimental and cantonment police regulations, it is necessary to state, at the same time, that "the marked diminution in disease among troops in 1876" attributed to these measures by the Medical Officer still left them with 257 admissions per 1,000 from primary infections.

In this instance, not only were police regulations and the lock hospital in operation, but the troops themselves were inspected, and punishments were inflicted on the men for resorting to unregistered women. As a further protective measure, the Medical Officer proposes to place the city out of bounds for the soldier.

We have cited this instance from Lucknow, a large station with 2,332 troops in 1876, as including similar cases more or less complete from all parts of India, and it is unnecessary to pursue the analysis of the papers further.

Taking the experience as it is, the following results appear to follow from it:—

1st. That there is little hope of further reduction of the amount of primary venereal affections among British troops in India by the single action of lock hospitals alone.

2nd. That the chief means of propagating the disease among troops are to be sought not among registered prostitutes, but among clandestine prostitutes.

3rd. The Commission would, therefore, suggest whether this aspect of the subject might not for the future occupy even more attention than has been bestowed upon it. In other words, whether dealing with clandestine prostitution should not be a main object aimed at at all stations, and the reduction of venereal disease among troops should be sought in putting an end to it, instead of trusting to registration and lock hospitals alone. On this point the Commission desires to express its concurrence in the objects aimed at in para. 5 of the Resolution of the Government of India which include the limitation of area within which preventive measures should be enforced,—the employment of special detective police, increased penalties on clandestine prostitution, and co-operation of the civil and military authorities in preventive and curative measures, and allowing only men of good character to pass beyond the protected limits.

The Lucknow experience already cited is not very hopeful, but it would, nevertheless, be quite worth while to try the effects of dealing with the question systematically and with energy; to make the attempt at least to reduce the present loss to the public service from these diseases. The proportion of admissions varies remarkably at different stations and during different years—events which have led to feelings of alternate hope and discouragement as to the effect of Contagious Diseases Acts. Possibly if these variations were considered with reference to the question of clandestine prostitution, they might afford important indications as to the required remedies.

But while giving expression to these views regarding the police question as raised by the papers, the Commission desires to record its objection against the employment of British soldiers for any such purposes.

Whatever police measures may be tried in attempting to diminish the present evil, it must not be overlooked that the evil itself is a moral one, and in this aspect is to be remedied only by the gradual moral elevation of the soldiers, and by the growth of self-control among them, aided by more rational diet, abstinence from strong drink, and facilities for occupation. On these points they would refer to the following conclusion arrived at by Mr. Hewlett, Acting Sanitary Commissioner in Bombay, who, while referring to the amount of venereal disease in the Bombay Army in his Report for 1876, in spite of the action of lock hospitals, says:—"In my opinion the real measures to adopt lie in quite another " direction . . . I am certain that the enforced idleness of the life the British soldier leads in India " tends very materially to the prevalence of both drunkenness and incontinence, and that the only " effectual remedy for diminishing the large annual loss of service to the State from each of these " vices is to afford the men such healthy employment as will occupy their minds and lessen the " temptation to commit them."

These were substantially the remedies proposed by the Royal Commission on the Sanitary State of the Indian Army 15 years ago, and the intervening experience has made no change in their apparent necessity.

3rd June 1878.

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No. 19.

Memorandum of the Army Sanitary Commission on the Report on Lock Hospitals of the Madras Presidency for 1876.

1. Lock hospitals have existed for a number of years at the following stations in the Madras Presidency, and these data abstracted from tables containing facts supplied by the Surgeon-General of British Troops give the admissions for various classes of venereal affections during the latest year, 1876 :—

British Troops.

Stations.	Average Strength.	Primary Syphilis.	Secondary Syphilis.	Gonorrhœa.	Total Admissions, including all others.
Bangalore	1,641	40	24	88	162
Bellary	898	141	16	75	251
Cannanore	696	13	40	12	66
Kamptee	909	57	18	158	255
Madras	636	49	8	103	171
Rangoon	742	57	22	40	123
St. Thomas' Mount	341	19	1	22	43
Secunderabad	2,327	183	75	209	491
Seetabuldee	50	3	2	8	16
Thyetmyo	674	19	19	37	77
Tonghoo	457	48	10	14	76
Trichinopoly	267	5	8	13	21
Wellington	447	26	8	19	56
Total	10,085	660	246	798	1,808

Hence the following were the results of lock hospitals to the health of troops during the year at protected stations :—

Average strength		
	10,085	
Admisssions.	**Numbers.**	**Per 1,000 Strength.**
Primary syphilis	660	65·4
Secondary ditto	246	24·3
Gonorrhœa	798	79·1
Total, including all others	1,808	179·2
Invalided from venereal diseases	27	2·67
Died	1	—

2. It is necessary together with these data to abstract the results for stations having no lock hospitals, premising that the numbers of troops at these stations have not been sufficient to enable any comparison except of a general kind to be drawn from them :—

Stations.	Average Strength.	Primary Syphilis.	Secondary Syphilis.	Gonorrhœa.	Total Admissions, including all others.
Poonamallee	150	5	44	8	58
Palaveram	21	—	—	3	3
Calicut	96	1	7	5	13
Malliapooram	93	—	1	1	2
Ramandroog	52	—	5	—	5
Port Blair	134	1	5	—	6
Total	546	7	62	17	87

The amount of the same classes of venereal affections at unprotected stations was hence as follows :—

Average strength		
	546	
Admissions.	**Numbers.**	**Ratio per 100.**
Primary syphilis	7	12·8
Secondary ditto	62	113·5
Gonorrhœa	17	31·0
Total, including all others	87	159·1
Invalided	4	7·3

As already stated, the numbers of troops are rather small for instituting a comparison, but on the other hand Poonamallee and Ramandroog, where 49 out of 62 admissions from secondary syphilis (more

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than half the total admissions at this group of stations) took place, are depôts, where secondary syphilis may exist apart from local causes of infection.

3. Assuming the admissions from primary syphilis and gonorrhœa as the best test of the number of primary infections at either class of stations, the results will stand as follows :—

	Ratios of Admissions per 1,000 Strength.		
	Primary Syphilis.	Gonorrhœa.	Both Classes.
Protected stations - -	65·4	79·1	144·5
Unprotected stations - -	12·8	31·0	43·8
Difference -	52·6	48·1	100·7

The facts must be left as they are, with the remark that they have reproduced themselves year after year, and that it would be an important step in the question to ascertain the reasons for this experience.

In view of recent and more careful observation of the history of reputed infectious diseases, it is no longer possible to assume the fact of infection as the chief or only one of which use can be made in the way of prevention.

Indian experience is on so large a scale that extended inquiry would throw much light on many questions of great importance to effective sanitary procedure, not only in regard to syphilis but other prevalent diseases. Indications of this advance have already shown themselves in several Indian reports.

4. This comparison between the amount of venereal disease at protected and unprotected stations being thus far from satisfactory, as regards protected stations, it is necessary to compare the admission-rates at protected stations for a series of years, in order to ascertain whether, admitting the difficulties in applying protective measures, there is distinct evidence of diminution of disease, marking greater efficiency in the administration.

The following are the facts as given in the Report :—

British Troops.

Years.	Ratio of admissions per 1,000 strength for all venereal complaints.
1871 - - - -	173·75
1872 - - - -	164·27
1873 - - - -	149·81
1874 - - - -	185·73
1875 - - - -	193·22
1876 - - - -	179·27

By carrying back the data for a few years the Surgeon-General points out that there have been periods of maxima and minima every fourth year, and the figures show no continuous improvement for the Presidency. This point may be further elucidated by the comparison afforded in the following abstract in the Report between two classes of admissions, viz., for troops and among women received into lock hospitals from 1871 to 1876 :—

Years.	Troop Admissions.	Lock Hospital Admissions.
1871	592	592
1872	682	839
1873	656	962
1874	860	889
1875	739	643
1876	660	729

There is no evidence of any causative relation between the figures ; it almost appears as if the disease followed a certain law of increase and decrement which included both classes of subjects.

The general results of the year's work are not satisfactory, but in the experience of individual stations there are exceptions, apparently, to this rule.

5. For example, Bangalore had 181 admissions per 1,000 from venereal diseases among troops in 1875, following on an average of 165 per 1,000 for 5 years, showing a considerable increase in admissions. The primary syphilitic cases were about 66 per 1,000 strength for the same period.

Last year, 1876, the total admissions were about 99 per 1,000, and the cases of primary syphilis were only 24·37 per 1,000. It is important for practical purposes to know whether there was such an improvement in the administration of the Contagious Diseases Act as to account for the improvement in the health of the troops. There are no facts stated in the Report under this head except the following.

The proportion of primary syphilis among prostitutes was, in round numbers, 2,623 per 1,000 in 1873. In 1876 the amount was 802 per 1,000, and the Surgeon-General goes on to state that "concurrent with these results there has been a diminution since 1873 of the average number of "registered prostitutes. The type of the disease has become comparatively mild. . . . . At "Bangalore the number of registered women is small, many of the women who consort with "Europeans are unregistered. Notwithstanding this fact, syphilis has greatly diminished among

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" women and troops. In 1875, 59, and in 1876, 18 women withdrew their names from the register, " and left, it is said, the cantonment. During the year under review, the attendance of registered " women at the periodic inspections was more satisfactory than in 1875, being about 50 per cent. of " the whole number as against 33 per cent. in 1875. Twenty-five unregistered prostitutes applied " for treatment during the year, being 16 in excess of the corresponding number for the preceding " year."

Table A. of the Report shows that the Acts were in operation over 14 miles of country, having a population of 142,513 (the troops, Table F, averaged 1,671 strength), and that the average number of prostitutes on the register was, in round numbers, only 76.

The question raised by the facts as a whole is whether the year 1876 was for Bangalore a year of decline in syphilis, or whether the results were due to the facts regarding the working of protective rules already stated, or to accidental causes? The reply can only be given by future experience in carefully working the Acts. At present only those women come under it who consort with Europeans, but Surgeon-Major Smith considers the Acts would be greatly improved if extended to all women within the area.

6. *Bellary* has shown a slight decrease in venereal admissions in 1876, viz., 251 admissions against 280 for the preceding year. The admissions from the most important cause, primary syphilis, were, however, 141 in 1876, against 125 in the preceding year. The causes assigned are " defective regis- " tration, insufficient detective agencies, irregular attendance of women at periodical inspections, " clandestine prostitution, and special difficulties owing to the facilities offered by the neighbourhood " of the barracks to clandestine prostitution."

7. At *Cannanore* the amount of disease among troops is apparently much the same. The Surgeon-General states that "the detective agency does not appear to be sufficiently effective."

8. *Kamptee.*—British troops at this station have averaged about 1,000 strength for the years 1872 to 1875, and the admissions were respectively 149, 196, 408, 257, which give the ratios for the years. In 1876, with a strength of 909, the admissions were 255, showing a reduction. For the same years the primary syphilis admissions have been 54, 102, 239, 72, 57. The following are the measures in force:—" The Cantonment Committee hold regular meetings, and the police have instructions to " apprehend all unregistered prostitutes. There is also a system of regimental police under the " superintendence of a provost sergeant for each corps, whose duty it is to prevent women of loose " character from gaining admission into or even from coming near the barracks." But the registration is stated to be far from satisfactory, " clandestine prostitution is prevalent, and its detection seems " to be difficult." The protective machinery at this station appears to be tolerably complete, so far as the law admits, but, notwithstanding this fact, the admissions to strength in 1876 were 280 per 1,000. To meet the necessities of the case, the Medical Officer expresses his " emphatic opinion that, " until stringent rules are framed for the supervision of all female punkah coolies, grass-cutters, and " the host of other native females employed in and about barracks, these women will always form a " fruitful source of venereal disease among the troops." Apparently the simplest way of meeting this view would be to dispense with the services of women for the purposes stated, so as to keep them away from the cantonments. The proposal only shows how little dependence can be placed on these rules, which appear to have been zealously applied at Kamptee with a very inadequate result.

9. The city of *Madras*, with a population of 397,552, has 636 troops in garrison. It has six health stations for the examination of prostitutes; the average number on the register was about 746, and those found diseased are treated in a lock hospital under civil management, and intended for the protection of the whole population including the garrison. The average daily sick in the lock hospital are 97. The case is one in which general protective measures are expected to be more or less efficacious among troops. The following have been the results for the last five years:—

British Troops.

Years.	Admissions from venereal diseases per 1,000.
1872	135·
1873	111·2
1874	164·
1875	254·
1876	269·

The annual admissions from primary syphilis for the same years have been 27, 26, 33, 36, 49. The results are certainly far from being favourable to the system.

10. *Rangoon* has a protective machinery similar to that at Madras. The town has a population of about 100,000, with a garrison of 742 British troops. There were 290 women on the register, and " clandestine prostitution is carried on to a considerable extent." The attendance for periodical examination appears not to be satisfactory, 924 were reported for non-attendances, and of these 35 were warned, 13 imprisoned, and 178 fined. The general result of the measures was that during the year there were 287 cases of primary syphilis and 18 of secondary syphilis brought under treatment among these women. Among troops the total admission for all classes of venereal affections amounted to 165 per 1,000, and for primary syphilis to 77 per 1,000, and 4 men were invalided. In view of these results the Medical Officer considers that for better registration the town should be divided into districts with an inspector over each. The Surgeon-General considers that, although early treatment of syphilis at Rangoon has diminished its virulence among patients at the general hospital, " there is still much to be " done at Rangoon to secure the full benefits of the Contagious Diseases Act in that town."

11. *St. Thomas' Mount.*—The strength of British troops at this station was 341, from among whom there were treated 19 cases of primary syphilis, 1 of secondary syphilis, 22 of gonorrhœa, and one other case; 43 cases in all, or about 126 per 1,000 strength. The numbers are small, but they are fewer than

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in preceding years. There is no Cantonment Committee, and the measures are under the Superintendent of Police. The numbers on the register are considered as fewer than the real number of prostitutes, and clandestine prostitution exists.

12. *Secunderabad.*—The facts in regard to Secunderabad may be compared with those already given about Bangalore, where the year 1876 showed considerable reduction in the amount of syphilis among troops, not accounted for by any marked improvement in the protective measures.

At Secunderabad, on the contrary, the conditions of the problem appear to be simpler. The Native population is 53,000, with an average of 120 women on the register, and the Surgeon-General states that "the registration practically extends to all classes within the area of the Act's operation (seven "square miles)."

The number of British troops at the station was 2,327, and the primary admissions were 183 primary syphilis, and 209 gonorrhœa. The total admissions were 491=211 per 1,000 strength, and there were 5 invalids. The results to British troops for the last seven years have been as follows :—

	Venereal admissions per 1,000.
1870	144·94
1871	216·74
1872	194·21
1873	107·35
1874	109·12
1875	214·91
1876	211·00

There can be no doubt of the truth of the Surgeon-General's opinion that "these results are dis-"appointing." But in view of possible improvements in the service it might be well, before accepting the Surgeon-General's view that "it is evident that clandestine prostitution is common, and that the "clandestine prostitutes are largely diseased," to submit the question to rigid inquiry.

If Secunderabad exhibits the best attainable results with what appears to be a tolerably complete organization, and if it can be rendered nugatory in this way by clandestine prostitution, the question naturally arises as to what is the use of the lock hospital and registration ?

13. *At Seetabuldee* there is a population of 84,441, with 16 prostitutes on the register, and out of 50 British troops at the station there were 16 venereal admissions to hospital, a ratio of 320 per 1,000, not a very satisfactory result for the year.

14. *Trinchinopoly*, with a strength of 267 British troops, had only five admissions from primary syphilis out of a total of 21 admissions or about 80 per 1,000, one man died, and another was invalided from secondary syphilis; and yet this result co-existed with the absence of a Cantonment Committee, and this other fact that the number of women on the register was four less than in 1875, and 18 less than in 1874, during which year the admissions among British troops were double what they were in 1876.

15. *Thyetmyo.*—This town has a Civil lock hospital, and the Contagious Diseases Act extends over an area of seven square miles, and also "to all women practising prostitution." The strength of British troops in 1876 amounted to 674, among whom the venereal admissions were 77, a ratio of 114 per 1,000. A fourth part of the admissions was due to primary syphilis, and another fourth part to secondary syphilis. The ratio of total admissions for the preceding four years was 73 per 1,000, showing a considerable increase in 1876.

16. The results of protective measures at *Tonghoo* are not more satisfactory, but the lock hospital was only established in 1874. Being a Civil hospital it is intended for the protection of Native population as well as of British troops, but judged by its results, such as they are, the Medical Officer says, "It is "evident that the lock hospital is not meeting the requirements of the station." During the three years of its operation the amount of disease among an aggregate strength of 1,356 British troops has been as follows :—

	Admissions per 1,000.
Primary syphilis	66·4
Total syphilitic admissions	123·

In the last of the three years, 1876, out of a strength of 457, the total venereal admissions were 166 per 1,000, and those for primary syphilis 105 per 1,000.

17. The only other station requiring notice is *Wellington*, where a lock hospital has been in existence since 1860. The Medical Officer states that "the registration and detective agency are efficient." Here, as elsewhere, periodical attendances are deficient, and women have to be fined and imprisoned for neglect. The strength of troops in 1876 was 447, and the venereal admissions were 125 per 1,000, nearly half of the amount having been due to primary syphilis.

18. These, then, are briefly the results of another year's operation of the Contagious Diseases Act at stations in Madras Presidency. As the subject is understood to be receiving the attention of Government, it is considered best simply to state the facts, and one or two points which appear to follow from them :—

(1.) Judged of by another year's experience, and over the stations as a whole, the results have been so unsatisfactory as regards the health of troops, that inquiry appears to be called for, with the view of arriving at the causes of failure and rendering the Acts more efficient, if found to be practicable.

(2.) The one hopeful experience arrived at has been at Bangalore, and the facts, together with their causes, merit being inquired into, with the view of learning whether any hints can be obtained regarding the general working of the measures which might be of use at other stations.

21st February 1878.

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No. 20.

Memorandum of the Army Sanitary Commission on Revised Rules for Outbreaks of Cholera, &c. in India.

These papers contain the Report of a Special Committee appointed by the order of His Excellency the Viceroy to examine this question. They include the Military rules (Rules laying down the "Measures to be adopted in India on the outbreak of Cholera, or appearance of Small-pox, 1878,") as altered in conformity with the recommendations of the Committee, and also a Resolution of the Government of India, dated 1st November 1877, calling the attention of Local Governments and administrations to "the general principles which ought to be observed in dealing with outbreaks of "cholera or small-pox among the civil population."

Bearing in mind the diversities of opinion in regard to the nature and ætiology of cholera which have prevailed in India as elsewhere, it is not surprising to find that the rules embody expressions and forms of procedure which are scarcely logical when compared with each other. Certain of the proceedings are of a public nature, and refer to measures to be taken by authorities, and certain others refer more peculiarly to the medical management of affected troops, the general principles of which are stated, but the details are necessarily left to the judgment of Medical Officers who are responsible, so that the principles themselves may be taken as embodying the ætiological views of these officers, and from this aspect they must be considered as purely departmental, and subject to change and modification with advancing knowledge.

The Commission, therefore, without giving any opinion on these ætiological points, but finding itself at the same time under the necessity of avoiding the appearance of acquiescence in forms of procedure which, apparently, are based on diverse views of cholera, proposes to restrict the following remarks solely to the substance of the sanitary clauses of the Committee's Report and to the Government Resolution, which, considered from the practical side, is one of very great importance to the future advance of sanitary improvements in India.

The following are the more important conclusions on the subject of land quarantine arrived at by the Committee:—

"(7.) So far as the Committee can ascertain, strict quarantine has never been attempted or "achieved in any part of India."

"(24.) The Committee believes strict land quarantine to be impossible in India."

"(27.) The best arrangements could not prevent quarantine restrictions from operating harshly on "thousands of poor people, and any arrangements short of perfection must give the police and other "petty executive agency power and opportunity to practise oppression and extortion on a vast "number of persons."

"(28.) The Committee does not itself approve of quarantine in any form for cantonments, for it is "unable to imagine the establishment of any form of inland quarantine which could effectually guard "against the introduction of cholera into any such place."

The Committee, therefore, propose no rules, but to leave the power of isolation of forts or jails in the hands of the proper officers, "so long as they do not exceed the powers which they legally "possess."

"(30.) With regard to fairs and places of pilgrimage, the Committee considers that all possible "steps should be taken to place the conservancy and sanitary arrangements of such places of con- "course on the best footing."

(31.) These arrangements are defined to be:—

Laying out the ground to prevent overcrowding.
Rigid attention to cleanliness, and dry earth latrines. Hospitals, attendants, and medicines.
Proper halting places for pilgrims at a suitable distance from crowded localities, cantonments, &c., supplied with good water, food, &c.

"(33.) The Committee considers the placing of a cordon round villages suffering from cholera, so as "to prevent the inhabitants from having any communication with persons outside, inhuman and "unjustifiable on any grounds."

(35.) The following important clause is inserted in this recommendation, and it has been transferred to the "Rules." After prescribing the provision of hospital accommodation in the event of cholera or any other epidemic appearing in a bazaar, the rule states,—"But no persons should be "forcibly taken from their friends, or removed to such hospitals, under any pretence whatever.' A check will thus be placed on practices which have caused loss of life, besides giving rise to great dissatisfaction among the people, and shaking their confidence in sanitary work generally. Under the 36th clause of the Report the Committee very properly lay down the following principle:—"The "dictates of humanity require that when cholera breaks out every effort should be made to tend and "comfort the sick, instead of subjecting them to the hardships and despondency of mind which must "ensue if they are treated as the disseminators of a deadly plague."

They further deprecate the adoption of any special rules in the case of troops or non-military individuals on account of cholera, other than such rules as may be adopted for other epidemics, leaving the question of special rules to commanding officers in conformity with the procedure given above.

"(39.) In conclusion, the Committee beg to state that, whilst they are unable to recommend the "enforcement of any quarantine restrictions on the ground that the efficacy of such measures appears "to them to be proved by any evidence which has been placed before them, they are of opinion that "the ingress into cantonments, and other centres of population, of masses of people, whether going "to or returning from fairs or places of pilgrimage, should be, as far as may be practicable, guarded "against."

"(40.) These people are generally in a more or less insanitary condition, they generate filth and "cause overcrowding."

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The Committee, however, deny the existence of any right to turn these people off good roads, but they advise that suitable roads should be made outside cantonments or cities, to be used when epidemics are about.

These, then, are the principles of procedure arrived at after long consideration and experience by officers well competent to form a judgment on the subject, and it is satisfactory to know that they are essentially the same as those long ago laid down by the Army Sanitary Commission on other evidence and experience.

But the Resolution of the Government of India on the Report enunciates principles of still greater importance, because they include the real preventive measures against Indian epidemics. The Committee have shown the uselessness of quarantine, and the Government has adopted this view in the following Resolution:—

"2. The report of the Land Quarantine Committee shows that, whatever benefit may be theo-
" retically anticipated from such quarantine, the system has proved impracticable, and Rule 78 of the
" revised rules prohibits the establishment or enforcement by commanding officers against the public
" at large, or any section thereof, of any land quarantine or any restrictions of the nature of quaran-
" tine as against cholera in particular, which are not equally applicable at all times to the control of
" vagrant classes of people having no legitimate ground for claiming admission within cantonment
" limits.

"The same principles should be followed by all civil officers. It may, however, be remarked that
" though the forced removal of residents of a place attacked with cholera to a cholera hospital is
" deprecated, seeing that infection is already among the population, discretion may be used in isolating
" pilgrims or other travellers found sick of cholera or small-pox in serais, on camping grounds, or
" elsewhere in the neighbourhood of towns or stations."

And then follow the really protective measures against cholera among the population of India, and which are at the same time most suitable for the prevention of advance of epidemics beyond the Indian frontiers:—

"3. Improvement in the sanitary condition of towns and villages is the best safeguard against
" cholera, especially improvement of the water-supply, the drainage, the conservancy, and the habi-
" tations. It should be impressed upon the people that these matters require constant and careful
" attention, and that such attention should be redoubled if cholera threatens. And just as all such
" improvements are to be encouraged and aided as far as possible, so on the other hand all insanitary
" conditions are to be avoided."

If these principles are recognised and acted on throughout India, cholera mortality will diminish, and all the objects of quarantine will have been arrived at. But the same diversity of principle already adverted to in the rules shows itself in the latter half of the paragraph, which is as follows:—

"In this point of view, gatherings of people when cholera threatens are attended with great danger.
" Under such circumstances fairs are liable to become *foci* whence epidemics radiate over a wide
" extent of country, and become the cause of death to thousands who have not attended the fair. It
" must be remembered that fairs generally entail overcrowding, and are often associated with privation
" and fatigue to travellers coming from a distance, all which circumstances are favourable to disease.

"When cholera threatens or is actually present in the part of a province where any fair is about
" to be held, the inhabitants of all districts from which the people generally congregate should be
" warned of the great risk they incur; if the disease is severe or threatens to be so, then the fair
" should be actually prohibited. The conservancy of fairs should at all times receive great attention,
" and more particularly when cholera symptoms prevail."

From what is known of the relation of insanitary conditions to the severity of cholera it may be safely stated that, if fairs are necessary for the prosperity of the people, they can be held without incurring the risks against which this paragraph is directed.

If in any district of India the sanitary state of the people has undergone no improvement, and if no steps are taken to provide for the sanitary state of fairs, then assemblages of people on foul ground, especially during cholera times, should unquestionably be avoided. But there have been no facts before this Commission for many years to show that where sanitary precautions have been taken in time any risk to public health has followed from fairs. So constant has been the immunity, or comparative immunity, from cholera at properly regulated fairs that, unless under exceptional conditions, the occurrence of epidemic cholera at such assemblages rather would appear to prove neglect in some quarter, and there may be some risk that the principles laid down in the latter sentence of the Resolution may give a cover for this.

The sanitary principle involved is clear enough, namely, that at any time or season of the year during which a fair can be held when epidemic cholera is not present in a severe form in the country, there ought to be no cholera at a well regulated fair.

The true principles to act on are those already referred to, and stated in the 30th and 31st sections of the Committee's Report.

However, the great gain to the public health of India lies in the practical declaration that quarantines are not to be depended on as safeguards against epidemics, and that in future these must be sought in the application of sanitary measures to towns and villages, and we would add to fairs also, and along the routes followed by pilgrims, as proposed by the Committee.

30th May 1878.

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No. 21.

Memorandum of the Army Sanitary Commission on the Report on Sanitary Measures in India in 1875–76. (Vol. IX.)

The present Report, with the appended Memoranda of the Army Sanitary Commission, affords a large amount of very important information regarding the sanitary condition of stations of British and Native troops, cities, towns, districts, and public institutions all over India, together with practical recommendations for removing local disease and death causes brought to light in the Indian Sanitary Reports and other documents. Increasing attention is being paid to the record of sanitary work done, so that the present India Office digest contains perhaps more information on this subject than it has been possible to supply in previous reports.

If extensively circulated in India the present Report would be of great service in calling attention to special local causes of unhealthiness, and the means of dealing with them. On the general selection of material, and its arrangement, the Commission has no suggestion to make. The most important point refers to that already mentioned; namely, extending the utility of these annual digests by calling the attention of the sanitary authorities in India to their contents.

5th March 1878.

No. 22.

Memorandum of the Army Sanitary Commission on a Report on Cholera in the Peshawur District during 1876 (Military Letter from Government of India, 29th March 1877, No. 81, paragraph 8).

1. This Report relates chiefly to the removal of troops to camping grounds from Peshawur station during the cholera epidemic of 1876. It contains also the statistics of the outbreak, but gives no sanitary details, which, however, may be looked for in the next Report of the Sanitary Commissioner. There is hence little calling for remark except what is related to the movement of troops.

2. Cholera having been present in several parts of the North-West of India, as well as in Cabul and Swat, as many troops as could be spared were marched from Peshawur to Nowshera, and at the date of the outbreak there were 34 Officers, 1,008 men, 60 women, 77 children, belonging to 5 corps British troops, and there were besides 7 corps of Native troops at Peshawur.

3. No account is given of the sanitary measures adopted to meet the epidemic, except the burning of fires and sulphur about the city and cantonments.

4. A suspicious case of cholera or choleraic diarrhœa ending fatally occurred in a man brought into one of the Native hospitals on August 10th, from a village a mile distant.

Restrictions on admission to cantonments were at once ordered, and preparations were made for moving troops. Nothing, however, took place for a month after. On the 12th September a case was reported near Attock, about 35 miles away, and next day, the 13th September, the first case took place in a woman in the city of Peshawur, where the disease lasted till November 11th, nearly two months, yielding in all 330 cases and 187 deaths.

5. The first case in Peshawur having appeared on September 13th, the Native troops were attacked on the 27th September, and the British troops on the 29th. On this day the Royal Artillery had 10 cases and 2 deaths; the 1st Battalion, 8th Regiment, had 2 cases and one death among men, and one case in a child. The 51st Regiment had 5 cases, 2 fatal, among men.

The results of the outbreak among British troops up to October 25th, the date of the last death, were as follows:—

		Cases.	Deaths.
Royal Artillery	Men	19	15
" "	Children	1	1
1st Battalion, 8th Regiment	Officers	1	1
" "	Men	28	16
" "	Children	3	2
51st Regiment	Men	9	7
"	Women	1	1
"	Children	1	1

The total losses of British troops were thus:—

	Cases.	Deaths.
Officers	1	1
Men	56	38
Women	1	1
Children	5	4
Total	63	44

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	Cases.	Deaths.
The losses among Native troops were - -	42 -	19
In the sudder bazaar and camp followers there were	38 -	28
The jail yielded - - - - -	1 -	1
The district - - - -	741 -	511

The total mortality within the limits above mentioned was 791 deaths out of 1,217 attacks.

6. As soon as cholera appeared among British troops, barracks were vacated, the men were encamped within cantonments, or placed in other buildings, or sent out in detachments.

The measures appear to have been taken actively and at once. So far as can be learnt from the statistics, 15 or 16 deaths may be fairly counted as due to the first stroke of the disease among men, and the other 22 or 23 deaths appear to have taken place after the troops were moved. But there is one important fact not to be forgotten, namely, that up to the day on which the troops were attacked there had been 124 cases and 56 deaths among the civil population and camp followers, besides 4 cases among Native troops. The real practical question which the experience suggests is whether the troops ought not to have been moved earlier, and as soon as the disease appeared among the civil population.

7. It is a remarkable fact that there was no cholera among the troops at Cherat, nor among the 6 Officers, 400 men, 14 women, and 24 children sent to Nowshera on 4th August, nearly six weeks before the disease appeared at Peshawur, "although cholera was actually brought into the latter "cantonment" (Nowshera).

8. The earliest precautionary measure taken at the Peshawur cantonment was a so-called quarantine, with such exceptional limitations as would render any supposed advantages from it nugatory. It was continued until the disease had "appeared in every part of the station, and the duty (in consequence of "detachments having gone into camp) being too heavy to maintain it."

It is of importance to call attention to the following fact, which is by no means a singular one in quarantine experience in India. It is this:

The two first cases of cholera in cantonments, as already stated, took place in Native soldiers. "Both "men had been on quarantine sentry duty on the circular road opposite their own lines during the "day, had not previously been away from the lines, and were both men of excellent character."

9. It would appear, from one of the paragraphs of the Report, that certain atmospheric conditions often observed in India during cholera epidemics were present at Peshawur. "There was a peculiar "heaviness of the atmosphere at this time, distinctly noticed by all during the day; the nights were "bright and clear, but during the day there was a powerful sun, and the hills were very indistinct, "with a thick mist hanging over them, which only disappeared when the sun went down. . . . "Towards the latter end of October a decided change in the weather took place, the atmosphere "became clearer and brighter, and the temperature of nights and days more equalised, and imme- "diately on this change the epidemic appeared to break and lose force; cases still occurred, but not "such severe ones, and the long hoped for end of the epidemic was predicted with success."

10. The facts given in this Report, so far as they go, are interesting and important. But they are necessarily deficient as regards the previous health of the troops and of civil population, as well as on the sanitary condition of the district. There are no means of judging how far premonitory diarrhœa existed, and the means taken to arrest it.

All we learn from the experience is that Peshawur, from its local position, is not unlikely to become the seat of cholera when the atmosphere is still and oppressive, if cholera be about. But the most important result of the cholera experience of 1876 appears to be that immediate action should be taken in all similar visitations when the city is attacked, that the longer the movement of troops is delayed after that event the greater will be the mortality, and that in order to enable immediate steps to be taken for protecting the troops from danger (as proposed in the present Report), "camp grounds might "with advantage be fixed, and kept cleared and free from cultivations, and wells sunk at sites which, "though advantageous, lack water."

11. But unfortunately we know from other papers which have come before the Army Sanitary Commission that, as regards local causes, Peshawur and its cantonment still exhibit sanitary defects sufficient in themselves to bring cholera on the inhabitants, and until these are remedied the only safe course to adopt, as already stated, is the immediate removal of troops to the most healthy accessible camping grounds. This is the result of the experience so far as the necessities of the service may enable it to be applied in similar emergencies.

30th June 1877.

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No. 23.

MEMORANDUM of the ARMY SANITARY COMMISSION on CORRESPONDENCE relating to MEHIDPUR CANTONMENT (Military Letter from Government of India, 11th June 1877, No. 140, paragraph 3).

The sanitary condition of Mehidpur cantonment, and the great prevalence of fever among troops quartered there, have been a frequent subject of comment by the Army Sanitary Commission, but until the receipt of the present papers the Commission has been only partially acquainted with the facts. Hitherto they have been under the impression that the cantonment was placed in its present position owing to military necessities, and they have endeavoured to point out what appeared to be the leading principles on which improvements might be carried out so as to enable the place to be occupied with as small an amount of inefficiency as possible. It is now evident, from the Quartermaster-General's letter (dated Mahableshwar, 16 May 1877), that the necessities of the Service have had nothing to do with the matter, but that the great losses which have been incurred year after year among Native troops at Mehidpur have been simply the result of a mistake, which requires to be pointedly noticed, because it is not the first of its kind described in Indian sanitary reports, and at the present day it ought to be perfectly possible to prevent the recurrence of such things. At all events, the present case may very well serve as a warning.

The following is the account of the matter given by the Quartermaster-General while dealing with the question of the possible removal of the lines to healthier grounds. He says: "Apart from the "expense, it is quite possible, there being a site within the limits of the present cantonment admirably "suited for the purpose. The site was once reported on by a Committee, and rejected because it "was on the confines of a swamp, but the swamp referred to was the ground referred to on the "lowest part of which the present lines stand, whilst the condemned site was on a fine dry slope above, "and to windward of it, capable of perfect drainage, and abundantly supplied with excellent water "from wells."

As this is an official statement of the facts, and seeing that the facts account for the great unhealthiness of the lines, the Commission begs to leave them without comment, except to state that before deciding to place the lines in the very centre of the evil which the Committee wished to avoid, it might have been well to consider whether the presumed disadvantages of the marshy ground might not have been removed by drainage, and so the position on the higher ground occupied without any risk whatever. That the lines would have been quite safe on this higher ground there is no reason to doubt from anything contained in any of the papers.

The ground occupied by the present lines is close to the banks of the Sipra river, and below flood level, the subsoil is black cotton earth liable to infiltration of water and retentive of moisture.

These facts, together with the high fever-rates, are sufficient to justify the Quartermaster-General's opinion that "the position of the lines is so faulty that it is impossible they can ever be healthy," and until they are removed every possible expedient will have to be adopted to render the lines habitable. Towards this end works of surface drainage have been carried out, but the lowness of the surface with reference to the river water level, especially where the river is subject to floods, has put a natural limit to drainage operations of this kind. Fortunately there has been no flood since 1871, and it is satisfactory to learn that, even with so bad a site, something may be done, by lowering the subsoil water level, to diminish the amount of fever. In this correspondence Dr. Townsend, Officiating Sanitary Commissioner with the Government of India, gives the statistics as follows:—

—	—	Average Strength.	Admissions.
1873 -	25th Native Infantry -	347	1,069
1874 -	10th " " -	365	718
1875 -	10th " " -	361	500

It is not stated how many admissions were due to fever, but the falling off in the total number is remarkable.

"In 1874," Dr. Townsend says, "the lines of the Native Infantry were thoroughly drained. In the "following year the system of drainage was extended to the cantonment generally, but it was not "carried out sufficiently early to affect the prevalence of malarious fever, which occurs annually after "the monsoon."

The men's huts have been improved, "good drinking water has been supplied from a new well,* and superfluous jungle cut down.

It might further improve the huts if the men's beds were raised above the ground as far as practicable, that is, provided this has not been already done.

Seeing that a considerable reduction in the sick-rate has followed on the drainage operations, the Commission would feel disposed to await the further results of the work when the drainage has been made as efficient as possible under the local circumstances; but judging of the facts as a whole it will in all probability be needful in the end to remove the lines to healthy ground.

8th August 1877.

* No analysis of the water is given, and no opinion can be formed as to the character of it.

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No. 24.

Report on the Physiological Effects of the Poisons of the Naja Tripudians and the Daboia Russellii. (By Surgeon A. J. Wall.)

I.—COBRA POISON.

In considering the subject of snake-bite with a view to the treatment to be adopted, two questions of the greatest importance arise: (1) How does snake-poison kill? or, in other words, what are the changes it effects in the animal system? (2) Is there only one poison common to all snakes, or are there several? Upon the answers to these questions depend both the certain recognition of snake poisoning when it comes under observation, and the indications that must serve to guide us in treatment, for unless we know with how many poisons we may have to deal, it will be impossible to say whether the same treatment will be suitable in all cases of snake-bite.

To answer these questions it will be necessary to examine with great care the symptoms produced by the various poisonous snakes, in order to detect any difference in their effects, paying especial attention to those conditions on which the fatal results are dependent, and any prominent signs that will enable us with certainty to say if in a given case we have really to deal with the results of snake-bite or not.

As the cobra is at the same time the commonest and the most deadly of Indian poisonous snakes, it will be best first to consider the symptoms produced by it, and the ways in which its poison may be fatal. To do this it will be necessary to detail a sufficient number of experiments to bring into prominence all the characteristic symptoms of cobra-poisoning, and from them to deduce the direct causes of death. We shall then have a standard by which we shall be able to contrast the effects of the poisons of the other species of Indian venomous snakes.

There are very few well recorded cases of cobra-bite in the human subject. The following is about the best; it is by Dr. Hilson (*Indian Medical Gazette*, October 1873):—

"On the night of the 19th June last year, at about half-past 12 o'clock, Dabee, a Hindoo punka-coolie, aged 40 years, while sleeping in the verandah of my house, was bitten on the shoulder by a snake. The night being hot and close, he was lying without any covering on the upper part of his body, so that nothing intervened between his skin and the fangs of the reptile, and as there was bright moonlight at the time, he was able to see his assailant, which he described as being more than a yard long and black. The noise and confusion that followed awoke me, but unfortunately about five minutes elapsed before I could get a candle lighted, so as to enable me to render him assistance. On inspecting the wound there were found over the prominence of the right deltoid muscle, and about three-quarters of an inch apart, two large drops of a clear serous-like fluid tinged with blood, which had apparently oozed from two small punctures, so minute that they could not be perceived with the naked eye. A burning pain was complained of in the neighbourhood of the bite, which rapidly increased in intensity, and extended so as to affect a circular portion of the integument of the size of an ordinary saucer; and, judging of the description given of it by the patient, I concluded it was very similar in character to that produced by the sting of a scorpion.

"Having learnt from the report of Dr. Fayrer's experiments that local treatment in such cases, unless instantaneously resorted to, is of no avail, I determined to give Professor Halford's remedy a trial. The hypodermic syringe necessary for this purpose I had with me, but unfortunately there was no ammonia in my house, and some had to be obtained from the Jail Hospital, about a quarter of a mile distant. While waiting for the ammonia, I had the patient walked up and down, and small quantities of brandy and water administered to him. At 12.45, or about a quarter of an hour after being bitten, he complained of a pain in his shoulder shooting towards his throat and chest, and said he was beginning to feel intoxicated; but there was nothing in his appearance at this time to indicate that he was in any way under the influence of the poison. On the contrary, he was quite calm and collected, and answered to all questions intelligently, while at the same time he was fully alive to the danger of his condition. 'A person bitten by a black snake never recovers,' he replied to one of his friends, who suggested, by way of consoling him, that the snake might possibly have been a harmless one. The pupils were not dilated, and they contracted when exposed to the light of a candle; his pulse was normal, and there was no embarrassment of the respiration. About five minutes after he began to lose control over the muscles of his legs, and staggered when left unsupported. At about 1 o'clock, the paralysis of the legs having increased, the lower jaw began to fall, and frothy and viscid saliva to ooze from the mouth. He also spoke indistinctly, like a man under the influence of liquor. At 1.10 A.M. he began to moan and shake his head frequently from side to side. The pulse was now somewhat accelerated, but was beating regularly. The respirations were also increased in frequency. He was unable to answer questions, but appeared to be quite conscious. His arms did not seem to be paralysed. At 1.15 A.M., the liquor ammoniæ having been brought to me (strength of the British Pharmacopœia), 25 minims of it were rapidly injected under the skin of the fore-arm; but as this produced no results, the basilic vein was laid bare and 25 minims injected into it.

"Having no skilled assistant with me, I had no time to observe what effect the operation had on the circulation, but it certainly caused no amelioration of the symptoms, and it was evident that the condition of the patient was fast becoming critical. He continued to moan and shake his head from side to side, as if trying to get rid of viscid mucus in his throat. The respirations were laboured, but not stertorous. The external jugular vein of the left side was next exposed, and 25 minims of the liquor ammoniæ injected into it, but without producing any good effect. The breathing gradually became slower and slower, and finally ceased at 1.44 A.M., while the heart continued to beat for about one minute longer. No convulsions preceded dissolution, which took place in one hour and five minutes after the infliction of the bite."

From the description of the snake there can be no doubt but that it was a cobra, and it will probably be admitted that the remedy administered had as little effect on the symptoms as it had on the result.

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It is evidently an excellent description by a careful observer, and may be taken as a typical case of the symptoms of cobra-poisoning in the human subject. However, before the whole of the symptoms of cobra-poisoning can be summed up, it will be necessary to observe the effect produced on the lower animals.

Experiment 1.

A medium-sized pariah dog had 0·6 cubic centimetre (about 10 minims) of fresh cobra poison injected subcutaneously into his leg.

5.21 P.M.—Injection.
5.23 P.M.—Lame in the leg in which the injection was made.
5.29 P.M.—Laid himself down but does not seem affected.
5.35 P.M.—Somewhat sleepy.
5.45 P.M.—Got up of his own accord; salivation; retching.
5.47 P.M.—Staggers about and hangs down his head.
5.48 P.M.—Cannot stand.
5.49 P.M.—Sleepy; respirations 40 per minute.
5.52 P.M.—Heart-beats 72 per minute.
5.55 P.M.—Convulsions.
5.56 P.M.—Convulsions continuing.
5.57 P.M.—Urinated.
5.58 to 5.59 P.M.—Convulsions.
6.5 P.M.—Respiration quite ceased; heart-beats 84 per minute; pupils commencing to dilate.
6.7½ P.M.—Heart stopped. Dead.

Experiment 2.

At 10.46 A.M. a pariah dog was bitten in the thigh by a cobra.
11.14 A.M.—Very lame in the bitten limb.
11.27 A.M.—Affected by the poison; staggers when he attempts to walk; chewing movement of jaw and lips.
11.28 A.M.—Salivation.
11.30 A.M.—Pupils somewhat small.
11.31 A.M.—Attempting to vomit.
11.35 A.M.—Respiration becoming slower.
11.37 A.M.—Respirations 16 per minute.
11.38 A.M.—Copious salivation.
11.39 A.M.—Respirations fallen to 12.
11.40 A.M.—Respiration of a "jerky" character.
11.42 A.M.—Tongue hanging out of the mouth.
11.43 to 11.45 A.M.—Convulsions.
11.46 A.M.—Convulsions lessening.
11.47 A.M.—Convulsions stopped.
11.47½ A.M.—Respiration completely ceased; pupils dilating.
11.49 A.M.—Heart stopped. Dead.

Experiment 3.

A pariah dog was watched for about an hour, during which his respirations varied from 40 to 62 a minute. His pulse was 120.

At 11.56 A.M. a very small quantity of fresh cobra virus was injected subcutaneously into the left thigh; the amount injected was about 0·1 cubic centimetre. The dog lay down after the injection, and seemed to take no notice of what had been done.

12.14 P.M.—Pulse 108.
12.15 P.M.—Respirations 48.
12.26 P.M.—Respirations 44; occasionally a deep inspiration; dozing.
12.29 P.M.—Respirations 36.
12.32 P.M.—Respirations 28; very regular; asleep.
12.35 P.M.—Respirations 24; respiratory movement very slight; still sleeping
12.37 P.M.—Respirations 24.
12.40 P.M.—Respirations 22.
12.43 P.M.—Awoke suddenly with a start, probably aroused by flies; chewing movement of lips and jaws.
12.45 P.M.—Attempting unsuccessfully to rise; staggered about on his fore legs.
12.47 P.M.—Respirations 26—hardly perceptible, of a somewhat spasmodic character, and lasting an exceedingly short time; salivation.
12.49 P.M.—Pupils about normal.
12.50 P.M.—Convulsive twitchings of the whole body.
12.52 P.M.—Tongue hanging out; convulsions much stronger.
12.55 P.M.—No trace of normal respiratory movement, only convulsions; micturition.
12.56 P.M.—Pupils slightly contracted.
12.58 P.M.—Convulsions are becoming feebler.
12.59 P.M.—No convulsive or respiratory movement whatever; pulse 120.
1.1 P.M.—Pulse 96; pupils dilating. The only sign of life remaining is the beating of the heart.
1.2 P.M.—Pupils fully dilated; heart stopped. Dead.

Experiment 4.

4.2 P.M.—A pariah dog was bitten on the leg by a vigorous cobra.
4.5 P.M.—Lame in bitten leg.

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4.14 P.M.—Affected; slight salivation.
4.15 P.M.—Tongue protruded.
4.16 P.M.—Convulsions; urinated.
4.17 P.M.—Pupils contracted; respirations slowing.
4.30 P.M.—Heart stopped. Dead.
4.31 P.M.—Pupils dilated.

Experiment 5.

A large pariah dog had five milligrammes (about $\frac{1}{100}$ of a grain) of dried cobra poison, dissolved in 0·3 cubic centimetre of distilled water, injected into its left hind leg.
12.12 P.M.—Injection.
4 P.M.—Vomited; no other symptom.
7.30 P.M.—Salivated; looks depressed, otherwise all right.
10.15 P.M.—Still depressed; salivation very slight; respirations 14.
12.5 A.M.—Still salivated, able to walk.
1 A.M.—Very depressed; salivation continuing.
8 A.M.—Very weak; hardly able to walk; all the legs are equally affected.
8.25 A.M.—Respirations 12; pupils somewhat dilated, but contract to light. Site of injection very red, hot, and swollen.
11.30 A.M.—Respirations 15; frothy salivation.
12 P.M.—Rectal temperature 102·2 F. (39° C.)
12.38 P.M.—Pulse about 120, extremely irregular; chewing movement of jaw and lips; salivation considerable.
2.21 P.M.—Better; can walk more easily; salivation stopped; took a little food.
2.28 P.M.—Drank sparingly of water.
5.30 P.M.—Very much better.
7.30 P.M.—Seems recovering fast; passed some urine—no albumen in it.
8 A.M.—Seems quite well; eats and drinks. Slight purulent discharge from site of injection. Passed a perfectly natural motion in the night. Respirations 20; pulse 120. The dog remained quite well. The normal pulse rate was 90, and his respirations 28.

Experiment 6.

A pariah dog was bitten by a vigorous cobra. The skin in the middle of the dog's back, as near as possible at an equal distance from its fore and hind legs, was pinched up, and the cobra injected its poison into it.
8.25 A.M.—Infliction of the bite.
8.26 A.M.—The dog is evidently in great pain from the bite; he turns round and round, in endeavouring to lick the bitten part.
8.29 A.M.—Is quieter; pupils normal; no symptom.
8.30 A.M.—Able to walk and stand perfectly well.
8.31 A.M.—Pupils normal; neither contracted nor dilated; they answer well to light.
8.35 A.M.—Slight spasm of diaphragm.
8.36 A.M.—Can walk perfectly.
8.39 A.M.—Walks with uncertain tread, as if weak; all the legs equally affected.
8.40 A.M.—Staggering, but no difference can be observed between the fore and hind legs.
8.41 A.M.—Fell over, his fore legs first giving way; pupils about normal—at any rate no tendency to dilatation.
8.42 A.M.—Lying on his side unable to rise, or even to stand when placed on his legs; all his legs equally weak; twitching of respiratory muscles, also to a less extent of certain muscles in his limbs.
8.43 A.M.—Tongue protruded.
8.44 A.M.—Pupils contracted; all motion ceased except that of heart.
8.45 A.M.—Slight spasm of depressors of larynx.
8.46 A.M.—Heart alone acting; pupils suddenly dilated widely.
8.47 A.M.—Heart stopped. Dead.

Experiment 7.

A strong healthy pariah dog had naturally 27 to 32 respirations a minute. Heart-beats 86 to 94.
4.24 P.M.—Bitten by a vigorous cobra.
4.25 P.M.—Seems frightened; struggled a good deal; respirations 48.
4.27 P.M.—Still struggling to get free; pulse 150.
4.28 P.M.—Respirations shallow; 50 per minute.
4.29 P.M.—Pulse 140.
4.32 P.M.—Respirations 48.
4.33 P.M.—Pulse 96.
4.34 P.M.—Tongue hanging out of mouth; respiration stopped almost completely; salivation; slight convulsions commencing.
4.35 P.M.—Pulse 60; convulsions.
4.36 P.M.—Convulsions.
4.39 P.M.—Pulse 72; convulsions nearly ceased.
4.40 P.M.—Convulsions stopped; pupils contracted.
4.42 P.M.—Heart stopped; pupils dilated. Dead.

Experiment 8.

A fowl was bitten by a cobra in the leg.
11.35¾ A.M.—Bitten.
11.36 A.M.—Trying to escape.

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11.37 A.M.—Lame in bitten leg.
11.37¾ A.M.—Head drooping.
11.37½ A.M.—Unable to stand or to lift head from ground.
11.38 A.M.—Respiratory movement barely perceptible.
11.38½ A.M.—No sign of respiration.
11.39 A.M.—Convulsions.
11.40 A.M.—Dead.

Experiment 9.

A fine large cock had two milligrammes (about ·03 grain) of dried cobra poison, dissolved in one cubic centimetre of distilled water, injected into its leg.

3.13 P.M.—Injection.
3.20 P.M.—Respirations 30 per minute.
3.34 P.M.—Prefers to sit, but can stand and walk.
3.38 P.M.—Head drooping, as if the neck were too weak to support it, but from time to time the head is raised with a jerk.
3.39 P.M.—Beak rests on ground.
3.41 P.M.—Respirations 25; can barely stand.
3.48 P.M.—Respiratory movement very slight.
3.50 P.M.—Cannot stand.
3.54 P.M.—Cannot keep the eyes open.
3.55 P.M.—Respirations 19; pupils somewhat contracted.
4.3 P.M.—Respirations 16; of a somewhat exaggerated character.
4.5 P.M.—Comb has become of a dusky purple colour; slight convulsive movements of body.
4.9 P.M.—Respirations 9.
4.13 P.M.—Slight convulsions.
4.15 P.M.—Pupils contracted; answer to light.
4.17 P.M.—Convulsions.
4.20 to 4.22 P.M.—Convulsions continuing, but gradually becoming less violent.
4.25 P.M.—Pupils widely dilated. Dead.

Experiment 10.

A medium-sized frog (*rana tigrina*) had a solution of 5 centigrammes (·77 grain) of dried cobra poison in one cubic centimetre of distilled water injected into its dorsal sac.

12.42 P.M.—Injection.
1 P.M.—No change.
1.23 P.M.—Struggling violently to escape.
1.40 P.M.—Becoming paralysed.
1.53 P.M.—Dead.

From these cases it may be gathered that the symptoms of cobra-poisoning are as follow:—The first manifestation of cobra poison having been injected beneath the skin is a sensation of pain in the bitten part. It seems to vary much in degree, but is usually described, as in the case given, as being of a stinging and burning character. The site of the wound may also become swollen, red, and painful on pressure. The evidence of the pain occurring in dogs is very clear; the animal often turns round and licks the bitten spot (see Experiment 6), and if it is the leg that is wounded it either limps on that leg, or, what is more usual, it draws it up (see Experiments 2 and 4), so as to ease it and relieve it completely of the weight of the body. This action has been termed paralysis of the bitten leg, due to the local contact of the poison with the muscles. Now, though it has been proved that the local effect of cobra poison on muscle is to weaken it, yet after the bite of a cobra a very small extent of muscle indeed comes in contact with the poison,—very often none at all; and if the limb were really paralysed, it would hang uselessly down, dragging upon the ground, instead of being drawn up.

An interval now occurs before the accession of any fresh symptom, but its length varies greatly in different cases. In that of the man quoted it was 15 minutes; but this is probably considerably under the average time. In another case related by the same careful observer an hour and a quarter elapsed in this way, and an intelligent eye-witness, who described a case evidently with great accuracy as to details, stated four hours passed before any change was noticed. Taking into consideration all the evidence on the subject, it appears probable that in the majority of cases of cobra-bite in the human subject an interval of an hour occurs before constitutional symptoms are developed. Under certain exceptional circumstances, however, to which reference will hereafter be made, the symptoms of poisoning may begin almost at once.

In animals this interval may be much less. In the cases given of the dogs bitten by cobras this interval was respectively 41, 12, 10, and 10 minutes. Between 10 and 20 minutes is probably the average length of this period in dogs.

This retardation of the constitutional symptoms probably means that before cobra poison can produce any effect it must be present in the blood in certain proportion; and of course in slow absorption, either due to the small quantity of the poison injected, or to its being injected into an unfavourable situation, some time must elapse before this proportion can be attained. In these cases the symptoms are delayed, as is also the fatal result; whereas should the poison enter the circulation rapidly, as by injection into a vein, the symptoms and fatal result follow immediately.

At the same time it is clear that for a short time a fatal quantity of poison may be present in the system without producing a symptom, for the bitten part may be sometimes amputated before the occurrence of any sign of poisoning, yet nevertheless the animal may die.

In man the first constitutional symptom that cobra poison produces seems to be a feeling of intoxication, although there appears to be no outward evidence of it. Both Dr. Hilson's patients asserted that they had that sensation. That this symptom is not more frequently described in the history of cases can be easily accounted for by the fact that it would require a certain amount of

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intelligence on the patient's part to mention it, and in animals of course it is impossible to get proof of a purely subjective condition.

The special symptoms of cobra poison now rapidly manifest themselves. In man it is very commonly observed that the patient cannot any longer keep his eyes open, and about this time it is found that he is losing power in his legs. When he walks he staggers, and, if left unsupported, falls. The arms seem to retain their strength much longer. In the case of dogs, the animal at this stage can scarcely stand without falling frequently, but there does not seem to be that difference between the anterior and posterior extremities that is observed in the legs and arms of a man. Usually a dog loses strength equally on his fore and hind legs (see Experiments 4 and 6), and rolls from side to side helplessly. This difference is worthy of notice.

The order in which the symptoms now occur varies in different individuals. In some loss of the power of speech and of raising the lower jaw is shown, and afterwards profuse salivation; but the salivation may precede. But whichever may occur first, the tongue and the larynx become speedily paralysed; the patient is unable to speak or to clear his throat or to swallow; and the saliva, which is profusely poured forth, trickles down the lips, the patient being no longer able to eject it voluntarily. In dogs it is not unusual for the salivation to be manifested before any other constitutional symptom, and in them a chewing movement of the jaw and lips is often seen immediately before the salivation. Nausea, retching, and vomiting are of frequent occurrence both in men and dogs.

The paralysis now becomes more general and decided. The patient lies on his back, almost incapable of movement. He threatens to be suffocated by the saliva running into his paralysed larynx; should however, the head be placed on one side, the abundant secretion will flow down his lips. His limbs at this time may be subject to startings and muscular twitchings. His breathing becomes slower and slower, and the respiratory excursus is lessened. He appears to be conscious, but is unable to express himself, through the paralysis of his larynx and tongue, but it is not unfrequently the case for the victim to become quite unconscious. The action of the heart is somewhat quickened, but the organ acts with fair strength. At last the breathing, too slow and too slight to support life, ceases, and with or without general convulsions the heart shortly after stops.

In dogs, as might be expected, convulsions are much more common than in man, being very generally present; and while in man the extinction of the respiratory act is, as a rule, a very slow and gradual process, in dogs it is not unusual for respiration to stop quite suddenly, and almost immediately after for its place to be taken by violent convulsions.

In birds the symptoms are usually very regular in their occurrence. There is the same appearance of local pain. The bird then generally seems drowsy, from its being unable to keep the eyes open, the head droops as if the neck were unable to support it, but the bird constantly recovers itself with a jerk. It at last sinks down to the ground, ultimately falling over on its side unable to raise either its head or itself. The pupils are, as a rule, somewhat contracted, the eye often watering. The respirations finally become exceedingly slow, and then cease, convulsions and death following. It sometimes happens, as in mammals, that the respiratory centre is almost simultaneously stimulated and paralysed, the bird dying at once.

In the amphibia there can scarcely be said to be any symptoms of cobra-poisoning: the frog, for instance, only becomes more and more sluggish and paralysed, and is at last found to be dead.

It will be necessary to consider some of the more important conditions in detail, after having noticed the appearances to be found after death.

Post-Mortem Appearances found in Cases of Death by Cobra-bite.

There is nothing very characteristic to be found after death from cobra-bite. The conditions present in the majority of cases may be summed up in the following way:—

Rigor mortis generally comes on about the usual time, and is as well marked as it is in death from ordinary causes. In two dogs that died at the same time—one of which was killed by cobra-bite and the other by ligaturing the trachea, and the bodies of which were kept under precisely the same physical conditions—*rigor mortis* came on at the same time and lasted about an equal time in each case.

The blood in man is, as a rule, fluid, and in the lower animals coagulated. If examined directly after death, no changes can be recognized by the microscope. After a time the corpuscles may change, become crenated, and blood crystals may form, but at the moment of death no change has been recognized. The parotid glands may be swollen. The brain itself presents no marked deviation from normal. The puncta vasculosa may be well marked and numerous. The veins of the pia-mater are usually gorged with blood, and the ventricles often contain a good deal of turbid fluid. The muscles are often of a dirty red colour. The subcutaneous veins bleed freely on section. The lungs may be pale and contain but little blood, but in the human subject they are generally found congested, the bronchi and the smaller tubes being often filled with a thin frothy fluid, and their lining membrane intensely injected. The heart is distended with blood, the right side being especially full. The liver bleeds on incision, and is quite dark from contained blood, though this is not universal. The kidneys vary from normal to excessive congestion, being seen in all stages. The stomach may or may not contain food—a proof that cobra-poisoning in the human subject does not always cause evacuation of the contents of the stomach. There is no regular change in the intestinal tract, which is sometimes injected in places. The bladder is generally firmly contracted.

Local Effects of Cobra Poison.

It has been mentioned that severe pain is generally felt in the region of the cobra-bite. There are, however, cases on record which seem to prove that the intense mental shock of snake-bite renders the victim occasionally insensible to the pain. This pain is accompanied by, or rather is dependent upon, a very characteristic local condition, which is of the utmost practical importance. If the body of a man or animal killed by snake-bite be examined, there may be scarcely a sign on the skin to mark the

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spot where the snake inflicted its bite ; or possibly one or two small punctures, or even a scratch, may be found, especially if the part bitten be the fingers, which, of course, are apt to be forcibly and involuntarily retracted when the bite is felt. It may even happen that the part is slightly swollen or discoloured. But whatever may be the condition of the external aspect there is no such wide difference to be found in the state of the parts beneath. If an incision be made through the skin and carried through the punctures made by the snake's fangs very little change will be found in the true skin. It may be a little more injected than normal, and the punctures will be found to be intensely so just at the edges, and a small quantity of blood may be effused there. But the areolar tissue lying beneath the true skin is the site of the most extensive changes. It will generally be seen to be of a purple colour, and to be infiltrated with a large quantity of coagulable purple blood-like fluid. In addition to this effusion the whole of the neighbouring vessels are intensely injected, which injection gradually fades as the site of the poisoned part is receded from, so that a bright scarlet ring surrounds the purple area, and this, in its turn, gradually fades into the normal colour of the neighbouring tissue. At the margin, also, the purple blood-like effusion is replaced by a pinkish effusion, which wells out as the incision is made. This effusion of pinkish fluid may often be traced up in the tissues surrounding the vessels which conveyed to the system the poison they had absorbed from the part. In one case, in which the victim was bitten on the hand, the effusion from the veins could be traced as high as the elbow. These are the essential characters of the local effects produced by cobra-bite ; but they may vary a good deal in degree, depending probably upon the amount of poison injected and the time the subject lived after being bitten. It has been asserted that the nature of these local changes in snake-bite is merely a hæmorrhage into the tissues from vessels that have been divided by the fangs of the snake, with effusion of blood from the vessels around. But though it is true that sometimes a very small amount of blood may be found at the site of the punctures, yet it is clear that this explanation will not account either for the great pain that is felt in the part, or for the intense injection of the neighbouring vessels. To determine the nature of these changes dissections were made both on the human subject and on the lower animals of individuals that had died of snake-bite ; also incisions were made into the tissues at the place where snakes had bitten at various intervals after the bite, and animals that had been bitten by cobras were killed by very rapidly acting poisons at different intervals after having been bitten to allow of full dissections being made at the various stages of the local process. The result of these observations is to show that directly after the poison is injected into a tissue its vessels become enlarged and gorged with blood, effusion is poured out immediately, and as the engorgement and stagnation of blood increase the effusion becomes more and more blood-like from its containing more and more of the solid contents of the vessels ; at the margins, however, the effusion retains an inflammatory character. Now these processes are singularly rapid in occurring. In an animal that only lived 30 seconds after the injection of the poison a well-marked circle of vascular injection was found at the site of the poison. In another case in one minute sufficient effusion had been poured out to attract the attention of a casual observer. The accompanying water-colour drawing* depicts a dog that was bitten by a cobra and allowed to remain under observation for five minutes, at the end of which time a very strong solution of strychnia was administered hypodermically at a spot far away from the site of the wound inflicted by the cobra, and the dog died almost immediately after it. From first to last it never had the slightest symptom of cobra-poisoning, and from the reception of the bite to death was barely six minutes, and yet the state of the parts affected is accurately represented in the drawing. The two separate areas of injection show the position in which the poison was deposited by the two fangs. The hyperæmia of the true skin at the fang puncture is well shown at a little incision in the left margin of the reflected skin. From this it will be seen how rapid and severe is the local mischief caused by cobra poison.

Should the animal recover from the constitutional effects of the poison, the result of these local changes will be profuse suppuration and sloughing of the part in which the poison was deposited. This is an universal sequel to the local effects. Now simple effusion of blood is very rarely followed by suppuration. In scurvy and allied diseases we constantly see effusions of blood rapidly absorbed as recovery proceeds. Again, effusion of blood is seldom attended by pain. Moreover, by using solutions of cobra poison of different strengths any degree of local mischief can be produced from an engorgement and acute effusion that scarcely differs from blood, to a slight hyperæmia attended with a pale serous-like effusion.

From these considerations it appears evident that the local effect of cobra poison is simply severe and acute inflammation, to which the pain attending cobra-bite is due, with a more than ordinary tendency to effusion from the blood-vessels. Corroborative testimony to what is here advanced must be present to the mind of every one who has had much to do in the manipulation of cobra poison. A very frequent, but involuntary, experiment is to get some of the poison into the eye. Should the circumstance not be at once noticed, so as to permit the eye being washed out immediately, after a very short time a smarting pain is felt in it, and if it is examined it will be found red and watering, the vessels becoming rapidly enlarged, and, in fact, an acute attack of conjunctivitis with chemosis is set up.

This subject has been treated of here at such length because of its great practical importance. One of the most difficult subjects in connection with the treatment of snake-bite is to know for certain whether the patient has really been poisoned by a snake or not, for it is clear that unless the venomous snake really injects his poison into the victim there is no danger. Now, the mark of the teeth is no guide, or next to none ; because a cobra may not leave a single mark visible to the naked eye, and, on the other hand, fanged harmless snakes, like lycodonts and dipsas, may leave punctures in the skin that might easily be mistaken for the wounds caused by the fangs of venomous snakes. And more misguiding, if possible, than any of these is the victim's description of the snake. From these various causes it often happens that a man is left without an attempt at treatment because the bite is not visible, or does not look like that inflicted by a venomous snake, or because there are no symptoms. Now we know that often symptoms do not occur till more than an hour has passed, when all chance

* The drawings accompanying the Report are not reprinted in this volume.—Ed.

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of preventing the absorption of the poison has gone. On the other hand, it has occurred that even severe amputations have been performed ending fatally when it has been proved afterwards that the man was not bitten by a poisonous snake at all. Therefore it will be seen how important it is to have some method by which one can tell if a man has really been *poisoned*, as well as bitten, by a snake. This can be done by simply making an incision and observing the condition of the tissues into which the poison would have been injected, to see if the characteristic signs of the inflammation caused by snake-poison are present. No ordinary wound, not even a poisoned wound, such as is received in dissections, would cause the immediate inflammation which is peculiar to snake-poison. In a simple or even ordinary poisoned wound, a very considerable time would elapse before any marked change would be noticeable. The chief sources of fallacy will be the attendant not being acquainted with the characters presented by a poisoned bite, or the incision being made at the wrong spot, or the poison having been injected directly into a vein instead of into the tissues, which might occasionally happen. But in the vast majority of cases a simple incision through the skin into the subcutaneous areolar tissue will afford certain information whether the case is one of poisonous snake-bite or not; for even if the blood-like effusion be not found, the intense hyperæmia of the part, and the pink fluid infiltration are quite as certain guides.

Action of Cobra Poison on the Nervous System.

That the chief action of cobra poison is on the nervous system there can be no doubt. This is very generally admitted, and the symptoms are very strongly corroborative of it. The exact nature of the action, however, is not so clear. The victim of cobra-poisoning just before death is usually an example of very complete general paralysis. Sir Joseph Fayrer and Dr. Brunton, who have contributed a most elaborate and valuable series of papers on the nature and physiological action of snake-poison to the Royal Society, maintain that though the greater part of the nervous system is affected, yet the terminations of the motor nerves suffer especially, and in a very marked manner. They base their reasoning on the results produced by experiments in which the excitability of two nerves of the same animal is tested, one of which has been subjected to the action of the poison, and the other has been kept from contact with the poisoned blood by the limb to which it is distributed being ligatured, the nerve, however, being kept intact. Under these circumstances a great difference will be found in the electric excitability of the two nerves. With the able assistance of R. Brough, Esq., Electrician to the Government Telegraph Department, these experiments have been repeated.

The electric arrangements were as follow:—A constant difference of potentials was maintained by means of a galvanic battery between the terminals of the primary series of coils of a Thomson's Slide Resistance. Two flexible insulated wires, the free ends of which terminated in platinum needles, and were used as the electrodes, were connected, the one to the zero end of the primary series of coils, and the other to the sliding contact of the secondary coils. By suitably moving the sliding contacts any desired difference of potentials could thus be established between the electrodes.

Experiment 11.

A frog (*rana tigrina*) was killed mechanically at 12.18 P.M., but reflex action continued for some time afterwards.

1.6 P.M.—Muscle was found to be infinitely sensitive. Nerve stimulated with 0·06 volt produced distinct contraction; both sides give the same result.

This experiment shows how sensitive muscle and nerve remain for some time after death from purely mechanical causes.

Experiment 12.

The right thigh of a frog (*rana tigrina*) was ligatured so as to completely prevent the blood circulating in the part below the ligature. The sciatic nerve was not included in the ligature. One cubic centimetre of solution of cobra poison composed of equal parts of distilled water and fresh cobra poison was injected into its dorsal sac.

2.53 P.M.—Injection.

It gradually became paralysed, till it ceased to show any signs of reflex action.

3.33 P.M.—The muscles of the left or poisoned side contracted with 2·97 volt.

3.33½ P.M.—The muscles of the right or non-poisoned side contracted with 2·16 volt.

3.37 P.M.—Nerve of poisoned side caused contraction of muscle when stimulated with 2·7 volt.

3.39 P.M.—Ligatured (or non-poisoned) nerve 1·08 volt.

Here there was a marked difference between the poisoned and the non-poisoned side, the non-poisoned side being the more sensitive, but the nerve on the poisoned side had lost its excitability to a greater extent than the muscle.

Experiment 13.

The right thigh of a frog (*rana tigrina*) was ligatured with the exception of its sciatic nerve, and one cubic centimetre of cobra poison, solution consisting of equal parts of distilled water and fresh cobra poison, injected into its dorsal sac.

12.48½ P.M.—Injection.

12.58.—Reflex movement ceased.

1.40.—Muscles of left or poisoned leg contracted with 2·43 volt.

1.40½ P.M.—Muscle of right or non-poisoned leg with 1·89 volt.

1.44½ P.M.—Nerve or poisoned side caused contraction in muscle when excited by 10·8 volt.

1.46 P.M.—Non-poisoned nerve with 0·54 volt.

In this experiment the sensitiveness both of the non-poisoned muscle and nerve, in comparison with that of the poisoned side, was greater than even in the former experiment.

These experiments seem to make it probable that cobra poison has some special property in deadening the terminations of the motor nerves, and Sir Joseph Fayrer and Dr. Brunton have in support of

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this view given some experiments in which, on irritating the spinal cord with an induced current, contraction was caused in the non-poisoned leg, but not in the poisoned. This result we have not been able to obtain, though we have made several experiments with this object.

Experiment 14.

A frog (*rana tigrina*) had 0·5 cubic centimetre of fresh cobra poison injected into its dorsal sac at 2.12 P.M., the right thigh, with the exception of the sciatic nerve, having been previously ligatured.

2.20 P.M.—Very slight reflex movement.

2.45 P.M.—Passing a current through the spinal cord, with interruption produced by means of a key, the muscles of both legs distinctly contracted at 0·5 volt.

2.52 P.M.—Spinal cord, mechanically crushed, gave distinct twitchings in both poisoned and non-poisoned legs.

In all our experiments, as long as the cord possessed power at all, contraction could be excited in either leg, provided the nerves had not been mechanically injured, which would rather indicate that the nerves retained their irritability, at the same time that the excitability of the cord was exceedingly quickly lost. Of course a good deal of allowance must be made for the difference in the method of excitation pursued in the two series of experiments. But though our experiments go to prove that the excitability of the motor nerves lasted as long as that of the spinal cord, yet the difference in the excitability between the two sides in the former experiments showed how powerfully paralysing cobra poison is. Our experiments, then, tend to show that the spinal nervous system is rapidly paralysed by cobra poison, but that the terminations of the motor nerves only suffer, *pari passu*, with the cord itself, and the poison has no elective affinity for the ends of the nerves. Nor are the results of the experiments of Sir Joseph Fayrer and Dr. Brunton incompatible with this view. For when one thigh of the subject of the experiment was ligatured and the other was poisoned, when the cord was excited by a current, the stimulus had to be transmitted to the non-poisoned leg through the trunk of the nerve which was unaffected, whereas on the other leg it had to overcome the resistance induced by the paralysing poison. There is no need to suppose a special effect of the poison on the ends of the motor nerves; the different lengths of the trunks affected would account for a considerable difference. To this we have to add the paralysing effect on muscle, which, though not so great as on the nerve, is yet not unimportant, and would tell on the same side.

Moreover, it does not necessarily follow that because a nerve to which poison has had access conveys electrical stimuli in a very imperfect manner, or not at all, therefore that the effect of that poison has been to paralyse the nerve. It is unfortunate that the only test we have of the vitality of a nerve is its power of causing contraction in a muscle when irritated by electricity or mechanically. It would be going too far to say, therefore, that because a nerve did not transmit such rude stimuli, it was dead; and even if the animal loses the power of withdrawing a limb that is being painfully stimulated, the break in the power of conducting impressions or stimuli may be in any part of the nervous chain necessarily called into requisition in such an action.

A poison that produces death by totally different means than paralysis may yet cause in the nerves a complete deadness to stimuli.

Experiment 15.

The right thigh of a frog (*rana tigrina*) was tightly ligatured, so as to completely prevent circulation through the limb, the nerve being included. One cubic centimetre of a solution of strychnia containing two centigrammes of strychnia was injected into its dorsal sac.

12.53 P.M.—Injection.

12.56 P.M.—Tetanus.

1.10 P.M.—Reflex action ceased.

1.23 P.M.—Muscles of right leg infinitely sensitive.

1.25 P.M.—Muscles of left (poisoned) leg contract with 0·75 volt.

1.39 P.M.—Right sciatic nerve infinitely sensitive, causes muscular contraction with less than ·0001 volt.

1.45 P.M.—Left sciatic nerve causes contraction with 15 volt.

Now strychnia certainly does not kill by paralysis, and yet the difference between the poisoned and the non-poisoned sides in regard to their nerves was more marked than in cobra-poisoning. In another frog this difference was very pronounced before the strychnia had ceased to produce tetanus, so that it occurs long before exhaustion has taken place. The complete cessation of the vital functions through tetanus is the real cause of death, and the deadening of the nerves is simply the result of the excessive nervous discharges that have taken place through them. Thus though the trunk or extremity of the nerve may be found paralysed, this does not prove that the paralysis was the cause of death, or that it was the direct result of the action of the poison on the nerve.

In this direction another point must be taken into account. One of the most characteristic features of cobra-poisoning in the human subject is paralysis of the legs. The patient is unable to walk or to stand, though his arms have not as yet experienced any loss of power. Now it would be difficult to suppose that this was due to the terminations of the motor nerves of the legs becoming paralysed while those of the arms remained unaffected. It is much more probable that the spinal cord is becoming paralysed; one of the first effects of which would be that it would lose the power of maintaining the tone and necessary contraction in the many complex groups of muscles on which the upright posture is dependent.

But in cobra-poisoning in dogs paralysis of the hind legs without the fore is rarely seen. In the vast majority of cases power is lost simultaneously in all four members. As a rule, in those cases in which it has been noticed that the hind legs have suffered first, the animal has been bitten on the hind leg, which would always cause a certain amount of lameness and difficulty of walking with the hind quarters, due to the local effect of the poison. But even with this source of fallacy it holds good that

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in men suffering from cobra-poisoning paraplegia is a most characteristic symptom, whereas it is exceptional in dogs. Why, then, as a rule, should paraplegia occur in men and not in dogs? Standing and walking are to a very great extent reflex acts. A man when walking places one foot on the ground, and the sensation of contact with the ground serves as a stimulus to a centre in the cord by which the motor impulse to move the other leg is excited, and paralysis of these few lower centres would at once impair the action. But in dogs the mechanism is very different. They move the fore leg of one side with the hind leg of the other. It is necessary, then, that the centres governing the movements in these limbs should be coupled, so to speak, together. The stimulus that moves the fore leg of the one side has to excite simultaneous movement in the hind leg of the other. Therefore all the inferior, or rather posterior extremity of the cord has to do in the case of the dog is merely to transmit the motor impulse from the forepart, whereas in man the inferior part of the cord has to translate a sensation into a stimulus to excite movement. It is, therefore, probable that the earliest injury inflicted by cobra poison on the nervous system is a paralysis of the centres in the lower part of the cord.

It will have been observed that paralysis of the lips, tongue, larynx, and pharynx, as evidenced by inability to retain the saliva within the mouth, by incapacity to move the tongue, or to speak, or to swallow, are very prominent signs of cobra-poisoning. It is singular that the striking resemblance of these symptoms to the disease known as glosso-laryngeal paralysis has not been previously noticed. Now the preponderance of medical opinion attributes this disease to lesion of certain tracts in the medulla. It cannot be thought, therefore, anything but reasonable to connect both diseases with paralysis of those centres in the medulla oblongata which are so closely associated together, and which are in connection with the roots of the vagus, the spinal accessory, and the hypoglossal nerves and the lower nucleus of the facial. But the resemblance does not end here. In both diseases the respiration becomes feebler and feebler, and the victim at last dies suffocated. In other words, the lesion in the one case, and the paralysing poison in the other, have invaded the respiratory nucleus so near to the centres they have already destroyed, and have thus rendered the respiratory act difficult and at last impossible. Lastly, after all the lower centres have been completely paralysed, the one by which connection is made with the second, fifth, and seventh nerves still acts, and the eye is closed when touched, and even when approached, after the animal is dependent on artificial respiration for life. For these reasons it seems natural to conclude that the principal action of cobra poison on the nervous system consists of an extinction of function extending from below upwards of the various nerve centres constituting the cerebro-spinal system; and though, no doubt, other parts of the nervous system suffer, it is directly to the destruction of the function of the respiratory centre that we have to attribute death in most cases of cobra-poisoning, cobra poison having a special affinity for the respiratory and allied centres.

In very rapid cases of poisoning, when a very large quantity of poison has entered the circulation at once, instead of the gradual extinction of function of the cerebro-spinal centres, the poison appears to act almost immediately by stopping the action of the respiratory centre. There is, of course, no time in these cases to watch the gradual extension of the influence of the poison on the nervous system. It also happens that before cobra poison paralyses the cerebro-spinal centres it first stimulates them and produces irregular action. This is sometimes very marked in regard to the respiratory centre when a large quantity of cobra poison has entered the circulation with considerable rapidity; and in this case it is very often seen that the other centres in the cord have shared in this stimulation before becoming paralysed, the result being irregular contractions in various groups of muscles. They, however, are not so well marked as those produced by stimulation of the respiratory centre, but the are equally rapidly followed by complete paralysis.

Action of Cobra Poison on the Respiration.

The action of cobra poison on the respiratory function deserves the closest attention, as death is generally the direct result of the extinction of this function by the effect of the poison.

The first change that is noticed in the breathing of an animal after the introduction of cobra poison is a decided quickening and deepening of the respiratory movement. Sir Joseph Fayrer and Dr. Brunton have shown that this effect is no longer to be perceived after section of the vagus nerves, and argue therefore that the acceleration is due to the stimulation of those nerves by the poison. But section of the vagus nerves is always followed by excessive slowing of the respiratory movement: thus in dogs the respirations are generally reduced by one-half. It is not improbable, therefore, that an agent that would somewhat stimulate and accelerate the action of the respiratory centre would fail in producing this result if administered directly after an operation that had so powerfully retarding an effect. The inhibitory effect of section of the vagi may be too powerful to allow of the accelerating action of the poison being perceived. But this quickening, however produced, is merely temporary, and after an interval of uncertain duration the respiration will be found to be slower, and the slowness to increase. The respiratory movement is also lessened in extent. The slowing and lessening of the respiration becomes at last too great to allow of the blood being properly oxygenated, and after the usual symptoms characteristic of asphyxiation the animal dies.

For the purpose of investigating the effect of cobra poison on the respiratory movements a stethometer with recording apparatus was employed. In this way tracings representing the movements of the walls of the thoracic cavity from the moment of the injection of the poison till death were obtained. The subjects on which the observations were made were dogs, fowls, and cats. It may be stated here that dogs are very sensitive to cobra poison; that cats, considering their relative size, are not nearly so, but succumb very gradually; and that in fowls the symptoms are very rapid in their development, and very speedily terminate fatally.

The simplest form in which to see the effects of cobra poison on respiration is in fowls, and the series of tracings on No. 1 depict them very vividly. The first tracing is the normal respiratory movement before the administration of the poison. No. II shows exaggerated movement with slight quickening. In No. III slowing first shows itself. In Nos. IV and V the retardation becomes more

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marked, but it will also be noticed that the character of the respiratory movement has also changed. It no longer consists of a gradual inspiration, so that the lungs are for a space kept filling with air, and then of an equally gradual expiration, so that time is allowed for a free interchange between the air entering and leaving; instead of this it will be seen that both inspiration and expiration are of a peculiarly sudden and abrupt nature. This is seen very well in No. V. There is no time for that gradual filling and emptying of the lungs that would allow of a free interchange of air. Thus the bird, in addition to the increasing slowness of respiration, has also to fight against the incomplete way in which respiration is performed. In No. VI all these characters are much more marked, the slowing especially being excessive. A kind of struggle against the poison is to be observed in the greater excurses of the movement, probably due to carbonic acid stimulation, but the sudden and jerking character is unabated. In No. VII the respiratory movement is reduced to a barely perceptible motion of the chest walls, completely incapable of effecting respiration. No. VIII shows even this movement absent, but at the end of the tracing the commencement of the convulsions that terminate life is marked.

In the cat the character of the respiration is very instructive, as it is an animal that becomes very gradually affected by cobra poison. Two series of tracings, No. 2 and No. 3, are given, as they each have points of interests. To take No. 2 first. In it the first tracing is merely for the purpose of contrast, as it was taken before the injection of the poison. No. II shows great quickening of the respiratory movement. In Nos. III, IV, and V the slowing is not so marked as the lessening of the respiratory excursus; but in No. V the retardation is very observable, but the movement has lessened to such a degree that it is represented by only a slight unevenness in the line. In No. VII it is barely possible to trace any movement at all, but the commencement of convulsions is shown by an abrupt series of elevations and depressions.

Series No. 3 was taken from a cat that succumbed much more rapidly to the poison than the one from which series No. 2 was taken. Tracing No. II depicts the acceleration. In No. III both the slowing and the lessened excursus is seen. In No. IV there is a peculiar character to be observed: there is a long interval with very slight movement, and then a deep inspiration with an equally deep and gradual expiration. It is a voluntary or half voluntary effort to aid the lessening respiratory movement, and is sometimes called cerebral respiration. This generally gradually lessens in frequency, and Nos. V and VI show the usual extinction of respiration and the following convulsions.

The effect of cobra poison on the respiration of a dog is shown in series No. 4. No. I was taken, as usual, before the injection of the poison. It happened that the respiration was very slow and deep at the time, which, however, shows more markedly the effect of the poison at first in quickening and then in lessening the respiratory movement, as will be seen in Nos. II, III, and IV. No. V shows the movements of the chest when convulsions are at their height. In No. VI the way in which convulsions terminate, their place being taken by slighter and slighter spasm of the respiratory muscles, which in their turn cease, is well shown.

In dogs, when a large quantity of poison has been introduced, though no sign of it may be perceptible for a long time, all at once the symptoms may develope with extreme rapidity, the excursus of the respiratory movement is almost destroyed, and the animal has twitchings of his whole body, which, however, are clearly due to insufficient oxygenation of the blood, as they are at once removed by artificial respiration. The chief interest in this condition lies in the fact that though the convulsions can be stopped by artificial respiration, yet the respiratory movement cannot be restored by the same means, but the functions of the respiratory centre remain in abeyance though the heart continues acting powerfully, as was proved in the first Report of the Commission.

From the above it will be seen how rapidly and completely cobra poison, when introduced into the circulation, destroys the respiratory function, so that cobra-poisoning is generally simply death from asphyxia in an acute form.

The series of tracings No. 5 shows graphically the instantly destructive character of cobra poison on the respiratory function. They were taken from a dog on whom the following observations were made:—

Experiment 16.

A powerful pariah dog had one cubic centimetre of fresh cobra poison injected into his saphena vein. No change was noticed for about 30 seconds; at the end of that time normal respiration abruptly stopped, its place being taken by violent and irregular contractions of the respiratory muscles. The heart's action continued strong, but increased greatly in frequency. Very soon all movement ceased, with the exception of that of the heart, which acted for about 10 seconds longer. The whole time from injection to death was under 100 seconds.

No. 5 is a continuous tracing of the respiratory movements of this animal from the administration of the poison up to the time when all power of motion had stopped. It will be seen that the place of the normal respiratory rhythm is taken by the most irregular upheavings of the chest walls and as sudden depressions, and then that all movement ceases equally suddenly. Death certainly did not result in this case from stoppage of the heart's action, as the heart could be distinctly felt acting after respiration had ceased. It is not probable that paralysis of the ends of the motor nerves was the cause of the respiration stopping, as the first thing noticed was abrupt exaggeration and interference with the regularity of the respiratory movement. Moreover, the advent of death was too rapid to render this likely. It seems reasonable, therefore, to conclude that when cobra poison enters the blood rapidly and in large quantity, its first action is to stimulate the respiratory centre and to greatly disturb its functions, and the next, and one might almost say simultaneous effect, is to paralyse it completely, the heart, however, continuing to act for a little time longer. It is, however, in the method previously described, and not in this latter almost instantaneous way, that cobra poison in all probability kills man in its most rapid way; for the quickest death on record in the human subject appears to have been a little under a quarter of an hour.

To sum up the different modes in which cobra poison destroys the respiratory function. First, by almost instantaneous paralysis of the respiratory centre. This is rare, and probably never occurs in

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the human subject, but can sometimes be induced in small animals by injecting very large quantities of poison directly into the circulation. Secondly, a primary stimulation occurs which produces the most irregular movements of the respiratory muscles, but terminates almost immediately in complete paralysis and death. It can be produced in dogs by injecting a quantity of poison into the circulation. Thirdly, by a much more gradual method, the poison being more slowly absorbed, when no marked change occurs for some time, and then some irregularity in the way in which respiration is performed is observed, and the respiratory action is soon, but at the same time gradually, extinguished; the convulsions of asphyxia may terminate life. This mode of death is very commonly seen in dogs who have been bitten by vigorous cobras. And, lastly, there is that gentle primary stimulation of the respiratory function which is shown only by acceleration, and which is gradually followed by slowing and lessening of the respiratory movement, and at last by its complete cessation. This is apparently the manner in which cobra poison in the vast majority of cases destroys the human subject.

Effect of Cobra Poison on the Circulation, Temperature, special Senses, Secretion, and the Blood.

Cobra poison cannot be said to exercise a very great effect on the circulation. Dr. Richards has shown that the heart can be kept in action and the blood circulating for very many hours after the rest of the functions of the body have been suspended. In ordinary cases of cobra-poisoning, too, the heart can generally be felt beating for a short time after respiration has stopped. Absorbed in the ordinary way, cobra poison appears to slightly accelerate the heart's action, and it also seems to lessen the blood pressure—at any rate for some time.

Sir Joseph Fayrer and Dr. Brunton have produced death by tetanizing the heart by injecting cobra poison into the circulation. But this was done by throwing the poison directly into a very large vessel, as the carotid artery or jugular vein in a small animal—the guinea-pig. But in the human subject it is probable that death is never produced in this way, as there does not appear to be a case of death on record in less than 10 minutes or a quarter of an hour, before which time the heart must have become accustomed to contact with the poison.

Cobra poison also appears to have but little influence on the temperature of the body. Sometimes a very slight rise is to be noticed; generally there is no change, and even a slight fall has been observed. It is probable, therefore, that it has little, if any, effect. The following experiment will show this:—

Experiment 17.

A healthy pariah dog had a temperature of 102·9° F. in the rectum. The pulse was 81 and the respirations 34. At 12.45 P.M. it was bitten by a vigorous cobra.

12.48 P.M.—Lame in the bitten leg, which it draws up.
1 P.M.—Seems quite unaffected.
1.10 P.M.—Affected; staggers when it moves.
1.15 P.M.—Temperature in rectum 103·1° F.
1.16 P.M.—Pulse 78, pupils normal.
1.17 P.M.—Respirations 28.
1.20 P.M.—Slight twitchings of respiratory muscles.
1.23 P.M.—Respirations 8.
1.24 P.M.—Strong convulsions; micturated; pupils contracted.
1.25 P.M.—All respiratory movements stopped; temperature 103·1° F.
1.26 P.M.—Pupils dilated.
1.27½ P.M.—Heart stopped. Dead.

The temperature began to fall directly after death.

In cases of cobra-poisoning of longer duration, we have unfortunately the disturbing influence of the local inflammation to consider, which would account for some variation in temperature.

In the special senses and their organs no marked change can be seen in cobra-poisoning; as long as consciousness is preserved the victim appears to hear and see perfectly. In regard to the eye there is very little to be noticed. The pupil can be said neither to be dilated nor contracted by the influence of the poison. At the moment of death it dilates widely, while up to that time it answers to light. If life be preserved by artificial respiration the pupils remain somewhat contracted. Probably cobra poison has but very little effect on the pupil, but if it has any it is very likely in the direction of contraction. Dilatation is, however, sometimes seen, especially in the earlier stages. Cobra poison causes too much inflammation if placed in the eye to allow of observations on the pupil being made in this way. Whether cobra poison affects accommodation cannot well be known, as the only means of determining it is to test the vision of a man under its influence. The eye retains its sensitiveness, and the eyelid the power of closing, for some time after most other parts are paralysed.

On the secretion cobra poison appears to have considerable influence. It seems as if most secreting structures were stimulated by it. The lachrymal glands act freely during cobra-poisoning. Salivation is a most marked and constant symptom; it is very rarely indeed absent in dogs, and it appears to be equally common in man. In dogs the saliva often runs from the mouth literally in streams; nor in man does it seem much less copious. Should only a small quantity of poison have entered the system salivation may be the only symptom.

The whole of the mucous tract is also apparently in an active state of secretion. After the stomach has been thoroughly emptied by vomiting, the animal will often bring up repeatedly large quantities of mucus, and mucous discharges are also frequently evacuated from the rectum. The respiratory mucous membrane, too, participates. Mucous secretion sometimes flows from the nose, and the air tubes are not unusually found bathed in fluid. Of its action on the liver and kidneys it is very difficult to get evidence, as the time before death is generally so short: in the more chronic cases sometimes the kidneys appear to act very freely, but sometimes there is apparently a diminution of urine.

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The effect of cobra-poisoning on the blood is an extremely difficult subject. It is, of course, by the blood acting as carrier that the poison is able to reach the system, and the blood of a cobra-poisoned animal is poisonous also to another animal. It is clear, therefore, that the poison exists in the blood. That it causes changes in it there is also evidence. In a man poisoned by a cobra it is very generally, indeed, found that his blood has become incoagulable, though in animals it is exceptional for this to be the case. Very occasionally, too, the mucous discharges from the body are stained with blood, as if the relation existing between the blood and the tissues had been in some way altered. If, however, the experiments given at the commencement are referred to, it will be seen that in not one was there noted a discharge of blood from a mucous orifice, and these cases were selected on account of being typical. If the published histories of other cases are consulted it will be seen that it is a very exceptional occurrence.

Again, when an animal has survived the nerve symptoms produced by cobra poison, it is generally found to be quite well, and to suffer no further inconvenience from blood-poisoning or other causes. In experiment 5, though the most severe nerve symptoms were shown, yet when they passed off the dog was quite as well as ever. In the published report of the Snake Commission by Drs. Ewart, Richards, and Mackenzie, in the experiments given as to the least amount of poison required to kill, no animal died after 32 hours, and the one case that lived that time, it is clear from the history died of nerve affection, Of the rest that survived, though many of them had the most serious nerve symptoms, not one appears to have given any evidence of blood change; also, out of the very large number of experiments on animals in Sir Joseph Fayrer's "Thanatophidia," there is only one prolonged case of fatal cobra-poisoning, and that apparently also succumbed from nerve causes.

The microscope, too, gives no evidence of structural change in the blood. In cobra-poisoning, also, albumen in the urine is unknown. In animals that have suffered most severely from nerve symptoms in which I have tested the urine albumen has not been present in a single case, either in fatal or non-fatal cases. When, however, artificial respiration has been performed for some time, it is not unusual for blood to be present in the urine; but if the kidneys are examined in these cases the wonder will be, not that blood was found in the urine, but that there was any urine secreted at all to mix with the blood, so great is the renal congestion. This circumstance, therefore, can hardly be taken as evidence of blood change.

In spite, then, of occasional discharges of blood from mucous surfaces, and that the blood of man is generally found fluid after death, if we take into consideration the facts that death, except from nerve symptoms, is almost unknown, that after the subject has recovered from the nerve effects he at once regains his usual health, *sequelæ* being unheard of, at least if we trust experimental evidence—always excepting the local results of cobra-bite, which are most severe—and that in the vast majority of cases there is no symptom of serious blood-poisoning even during the occurrence of the nerve symptoms, also that the kidneys give no evidence of altered relation to the blood, and that as a rule the coagulability of the blood is not destroyed in animals, we may conclude that though cobra venom is a nerve-poison of surpassing deadliness, as a blood-poison it is not an agent of much power.

II.—DABOIA POISON.

The snake that it will be most advantageous for various reasons to consider next is the Daboia Russellii, an extremely poisonous snake, found in great abundance in Bengal Proper, in many other parts of India, and in Ceylon. It is a very fierce snake, striking, after a little provocation, with deadly precision; it has a very stridulous noisy hiss. It belongs to the viperine family of snakes, of which it is a typical member. For this reason it is taken here as an example of a viperine snake, in the same way that the cobra was taken as the representative of the colubrine family. It will be best to follow the same plan that was adopted in cobra-poisoning, detailing first the symptoms of a sufficient number of cases of daboia-poisoning to elicit all the points of importance, and then to discuss the conditions on which the fatal results depend. Unfortunately there does not appear to be a well-recorded case of daboia-poisoning in the human subject, so it will be necessary to resort to experiment.

Experiment 18.

A small quantity of fresh daboia poison (about 0·1 cubic centimetre) was injected into the thigh of a pariah dog.

12.20 P.M.—Injection.
12.25 P.M.—Very lame in the leg in which injection was made.
12.44 P.M.—Looks very depressed and sleepy.
12.49 P.M.—Slimy motion passed.
12.52 P.M.—Very drowsy; unsteady in walking.
12.54 P.M.—Pupils widely dilated; iris only just visible.
12.56 P.M.—Moaning; lying down with head resting on ground, trying every now and then to stand up, but soon desisting from the attempt.
12.58 P.M.—Constantly attempting to rise.
1 P.M.—Panting; managed to raise himself to a standing posture, but his legs "doubled up," as it were, under him, and he fell to the ground.
1.5 P.M.—Violent respiratory movements; respirations 28.
1.6 P.M.—Still able to move his head freely.
1.15 P.M.—Still tries occasionally to rise.
1.17 P.M.—Moaning.
1.20 P.M.—Moderately loud screams.
1.25 P.M.—Convulsions.
1.32 P.M.—Convulsions.
1.34 P.M.—Dead.

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Experiment 19.

A pariah dog was bitten in the thigh by a daboia.
11.57 A.M.—Bitten.
11.59 A.M.—Lame in the bitten leg.
12.3 P.M.—Violent convulsions, all the limbs forcibly extended and tense; pupils normal; urinated; screaming.
12.5 P.M.—No trace of the convulsions left.
12.8 P.M.—Hind legs paralysed.
12.9 P.M.—Vomiting.
12.13 P.M.—Screaming.
12.14 P.M.—Pupils dilated; not able to stand; much less power in hind than in fore legs.
12.19 P.M.—Sanious fluid oozing from rectum.
12.20 P.M.—Screaming; tongue has a slight tendency to fall to the side of the mouth.
12.21 P.M.—Forcible contraction of diaphragm.
12.25 P.M.—Respirations 52.
12.30 P.M.—Large quantity of blood-coloured fluid passing from rectum.
12.35 P.M.—Lying down quite paralysed.
12.40 P.M.—Respirations rapidly diminishing in number and extent of movement.
12.47 P.M.—Respirations about 10 a minute.
12.50 P.M.—Respirations reduced to an occasional spasm of inspiratory muscles.
12.55 P.M.—Dead.

Experiment 20.

A pariah dog had five milligrammes (·077 of a grain) of dried daboia poison injected subcutaneously, dissolved in one cubic centimetre of water.
12.56 P.M.—Injection.
1.54 P.M.—Quite well; respirations 44.
7 P.M.—Ate a good dinner of meat, though not apparently with great relish.
11 P.M.—Seems a trifle depressed; has had copious motions, but quite natural.
3 A.M.—No change.
6 A.M—Looks a good deal depressed; respirations 48 a minute.
7.30 A.M.—Pupils contracted; panting; respirations 60 a minute.
8.15 A.M.—Panting excessively.
8.30 A.M—Passed a sanious motion.
8.45 A.M.—Respirations 80, excessive dyspnœa; blood oozing from mouth.
9.30 A.M.—Dead.
After the death the fatal dyspnœa was found to be dependent on œdema of the lungs.

Experiment 21.

A small pariah dog was bitten in the thigh by a small Daboia Russellii.
12.34 P.M.—Bitten.
12.35 P.M.—Slightly panting.
12.35½ P.M.—Fell over suddenly in violent convulsons, his hind legs being especially strongly convulsed; pupils contracted.
12.36 P.M.—Slight attempts at respiration.
12.39 P.M.—Dead.

Experiment 22.

Injected a small quantity (about 0·1 cubic centimetre) of fresh daboia poison subcutaneously into a dog.
12.43 P.M.—Injection.
1.6 P.M.—Defection.
1.7 P.M.—Looks rather wild.
1.15 P.M.—Apparently somewhat affected; head drooping.
1.21 P.M.—Respirations 70.
1.30 P.M.—Respirations 44.
1.45 P.M.—Pupils dilated.
2.33 P.M.—As the animal did not seem seriously affected, a small quantity of daboia poison again injected.
2.55 P.M.—Bitten by a daboia.
3.50 P.M.—Sudden tetanic spasm of muscles almost universal; attempted, unavailingly, to rise; pupils widely dilated.
4.3 P.M.—Convulsions.
4.4½ P.M.—Violent convulsions.
4.6 P.M.—Respiration stopped.
4.10½ P.M.—Heart stopped. Dead.

Experiment 23.

A somewhat small pariah had a pulse of 88; respirations 30; rectal temperature 102·2° F (39° C.)
3.24 P.M.—Bitten by a Daboia Russellii in the thigh; struggled and cried much while being bitten.
3.25 P.M.—Lame; draws up the leg that was bitten.

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3.28 P.M.—General muscular spasm of the most violent character, all parts of the body taking part The animal fell down and rolled about in convulsions; even the muscles of the eyeballs shared in the spasms—jerking the eyes about in the strangest way.
3.30 P.M.—Convulsions ceased; complete paralysis of both hind legs; tries to stand, but cannot get beyond just resting on his fore legs.
3.31½ P.M.—Spasms of muscles of eyeball continue; respirations very shallow, 68; pupils somewhat dilated.
3.37 P.M.—Muscles of eyeball at rest; seems utterly prostrate, and unable to move; respirations 40, chiefly abdominal.
3.40 P.M.—Respirations 56, shallow; occasionally a deep sigh.
3.44 P.M.—Pupils somewhat dilated, but contract to light.
3.47 P.M.—Respirations 67, about every tenth one is very deep.
3.50 P.M.—Moaning.
3.53 P.M.—Pulse 156.
3.55 P.M.—Pupils dilated.
3.56 P.M.—Moaning; temperature 103·1° F.
4.1 P.M.—Respirations 32; sighing and moaning; lying down paralysed; sanious discharge from rectum; pupils widely dilated.
4.6 P.M.—Still moaning.
4.9 P.M.—Respirations 36.
4.12 P.M.—Respiration reduced to a quick inspiratory spasm, followed by relaxation.
4.15 P.M.—Respirations 16.
4.17 P.M.—Dead; temperature 103°.

Experiment 24.

A pariah dog was bitten on the shoulder by a daboia.
3.7 P.M.—Bitten.
3.9 P.M.—As the snake had been in captivity some time, the dog was again bitten by another daboia.
3.13 P.M.—Defecated.
3.14 P.M.—Violent spasms of all the limbs, specially the hind ones; arching of back, twitching of muscles of eyeball; pupils normal; fell over on his side.
3.15 P.M.—Pupils dilated.
3.16 P.M.—Defecating.
3.18 P.M.—Able to get up again; walked about.
3.19 P.M.—Lay down again voluntarily.
3.23 P.M.—Moaning.
3.37 P.M.—Still lying down; is now unable to raise himself, or to stand when raised.
3.41 P.M.—Blood-stained motion.
4.3 P.M.—Screaming.
4.17 P.M.—Respiration failing.
4.30 P.M.—Respiration stopped. Heart ceased directly afterwards.

Experiment 25.

Five milligrammes (·077 grain) of fresh daboia poison, diluted with water, were hypodermically injected into the thigh of a dog.
12.20 P.M.—Injection.
12.35 P.M.—No symptom except it appears to have some uneasiness in the place of the injection.
1 P.M.—No symptom.
3.25 P.M.—Seems quite well.
7 P.M.—No change.
9 P.M.—Quite well.
11.30 P.M.—No change.
6 A.M.—Is still quite well.
10 A.M.—No symptom.
11 A.M.—Slightly lame in the leg in which the injection was made.
11.45 A.M.—Vomited.
7 P.M.—Refused his dinner.
8 P.M.—Looks somewhat ill.
11 P.M.—Still ill.
6 A.M.—Ate some food; passed some slightly albuminous urine.
5 P.M.—Has been improving all day.
8 A.M.—Quite well with the exception of pain, tenderness, and swelling at the spot where the poison was injected.
The dog recovered perfectly.

Experiment 26.

A kitten was bitten by a very small Daboia Russellii.
12.54½ P.M.—Bitten.
12.56 A.M.—Walking about as if nothing had happened.
1 P.M.—Restless.
1.2 P.M.—Urinated and defecated.
1.4 P.M.—Without any warning fell over in violent convulsions.
1.5 P.M.—Respiration almost ceased.
1.7 P.M.—Respiration again becoming established.

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1.8 P.M.—Tried to rise, but was unable.
1.9 P.M.—Respirations 60 per minute.
1.10 P.M.—Respiration almost stopped again.
1.14 P.M.—20 respirations a minute.
1.17 P.M.—Convulsions.
1.18 P.M.—Dead.

Experiment 27.

A fowl was bitten on the leg by a Daboia Russellii.
11.30 A.M.—Bitten.
11.30¼ A.M.—Respirations slightly accelerated.
11.30½ A.M.—Violent convulsions.
11.31¼ A.M.—Dead.

Experiment 28.

A medium-sized frog (*rana tigrina*) had a solution of one decigramme (1·54 grain) of daboia poison, dissolved in one cubic centimetre of distilled water, injected into its dorsal sac.
1.12 P.M.—Injection.
1.20 P.M.—Struggling and crying out.
1.30 P.M.—Lying quite quiet.
2.41 P.M.—Seems unaffected.
3.28 P.M.—Somewhat sluggish.
4.13 P.M.—Still sluggish.
4.30 P.M.—Violent respiratory efforts.
4.39 P.M.—Fast becoming paralysed.
4.53 P.M.—Completely paralysed.
5.11 P.M.—Dead.

From these experiments it will be seen how very great is the dissimilarity in the symptoms in different cases of daboia-poisoning. Hardly any two cases are alike. Thus in Experiment 18 the dog becomes gradually paralysed and dies of asphyxia. In Experiment 19, six minutes after being bitten it falls into severe convulsions, after which it is found to be paralysed, the paralysis ultimately stopping respiration. In Experiment 20 no change was observed for 17 hours, and then the animal died of lung complication. In Experiment 21, in a minute and a half after being bitten, the dog fell over in violent convulsions, and died at once. In Experiment 22, after the injection of the poison there was hardly any symptom; then the dog was bitten by a daboia, had sudden tetanic spasms of the muscles, and shortly after the respiration stopped. In Experiment 23, three minutes after being bitten, the dog had the most violent convulsions, to which paralysis immediately succeeded, which became more and more complete till death. In Experiment 24 there were convulsions, but they passed off, leaving the animal apparently unaffected and able to walk about; then it became gradually paralysed, and in this state died. In Experiment 25, where a small quantity of poison was injected, the only symptoms that occurred were vomiting, refusal of food, and albuminous urine, and suppuration at the spot where the poison was injected. In Experiment 26 the animal had convulsions, from the effects of which it almost immediately died. In Experiment 27 the fowl died almost instantaneously of convulsions, but in Experiment 28 the frog became gradually paralysed, and died after four hours.

We have here nearly every kind of death, from that produced instantly by violent convulsions to a lung affection coming on many hours after the administration of the poison, and unaccompanied by any nerve symptoms at all.

The following experiments throw some light on the causes of these differences:—

Experiment 29.

A pariah pup had about 0·1 cubic centimetre of fresh daboia poison injected subcutaneously into the shoulder.
12.52 P.M.—Injection.
1 P.M.—Vomiting.
1.1 P.M.—Sat down voluntarily.
1.3 P.M.—Can stand and walk; defecating.
1.4 P.M.—Can stand, but cannot walk.
1.5 P.M.—Got up of his own accord to vomit.
1.6 P.M.—Can stand, but prefers lying down; pupils contracted.
1.8 P.M.—Cannot stand; moaning.
1.11 P.M.—Slight sanious discharge from rectum.
1.15 P.M.—Short rapid respiration, with an occasional deep inspiration.
1.18 P.M.—Pupils contracted.
1.30 P.M.—Respiration very slight.
1.38 P.M.—Respiration still fainter.
2.6 P.M.—Dead.

Experiment 30.

A pariah pup of the same litter as the one in the last experiment, and as near as possible of the same size, had 0·3 cubic centimetre of fresh daboia poison injected into its shoulder subcutaneously.
1.31 P.M.—Injection.
1.32 P.M.—Seems in pain.
1.34 P.M.—Defecating.
1.35 P.M.—Fell over in convulsions.
1.37 P.M.—Unable to stand.
1.45 P.M.—Lying down; is quite paralysed, but occasionally groans.

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2.1 P.M.—Totally unconscious.
2.16 P.M.—Respiration failing.
2.29 P.M.—Dead.

In these two dogs, which were of the same age and size, the daboia poison was injected into exactly the corresponding part in each, and subcutaneously; but in the latter experiment three times as much poison was injected as in the former case. This was the only difference in the two experiments, and the result was that the animal which had the larger quantity of daboia poison in four minutes had violent convulsions, and from that time was quite paralysed, whilst the other only gradually became paralysed and had no symptom of convulsions at all. The amount of poison given in even the latter case was not above a third of the quantity that a daboia could inject. The poison in both cases was from the same viper, and extracted at the same time.

Experiment 31.

A fowl had two centigrammes (about ·3 grain) of dried daboia poison, dissolved in ·3 cubic centimetre of water, injected subcutaneously into its leg.
12.17 P.M.—Injection.
12.19 P.M.—Defecated.
12.20 P.M.—Curious twitching of the muscles of the neck, followed immediately by violent convulsions and death.

Experiment 32.

A third of a cubic centimetre of water containing in solution about half a milligramme of dried daboia poison was injected into the leg of a fowl subcutaneously.
3.37 P.M.—Injection.
3.45 P.M.—No symptom.
3.52 P.M.—Greatly exaggerated respiratory movement.
3.55 P.M.—Head drooping, beak resting on ground.
3.59 P.M.—Cannot stand.
4.4 P.M.—Lying on its side.
4.24 P.M.—Convulsions.
4.25 P.M.—Dead.

In these two experiments also the same thing is to be noticed. Two centigrammes produced the most violent and fatal convulsions, and the result would have been the same if two milligrammes only had been used, whereas half a milligramme produced only the symptoms of paralysis followed by asphyxia. The convulsions in this case followed the paralysis, and were dependent on asphyxia, precisely in the same way as they occur in cobra-poisoning. From these experiments we see that though a very small quantity of daboia poison may only cause gradual paralysis, a somewhat larger one will produce death at once by convulsions in an animal of the same size. In the same way it can be proved that the same amount of daboia poison given to two animals of different sizes, though the larger may escape the convulsions altogether, the smaller may die at once in them.

We must conclude, then, that in daboia poison we have to do with a substance capable of producing the most violent convulsions, and that the larger the animal the greater is the quantity required to produce this effect. But these convulsions are in no way dependent upon the entrance of the poison directly into a vein, as sometimes happens in the case of cobra poison; and birds are so susceptible to this substance, that it is only with difficulty that a sufficiently weak solution can be prepared to cause any symptoms at all with the avoidance of convulsions.

The first symptom, then, after the local pain, which appears to be peculiarly severe in daboia-poisoning, will very probably be the appearance of convulsions. But their occurrence depends, as we have seen, upon the size of the animal and the amount of poison injected. I have seen an extremely large pariah dog so severely convulsed that it seemed probable that he would die in them. At the same time a small dog may escape them altogether. It is entirely dependent on the quantity of poison injected by the snake.

If the convulsions occur, they generally take place in from one to ten minutes after the infliction of the bite—probably five minutes is about the average; and they may have any degree of severity from violent contractions of nearly every muscle in the body, so that the animal dies almost instantaneously, to just a few twitchings of the muscles of the legs or other parts. As a rule, they are severe; every muscle, it seems, taking part in them, the muscles of the eyeball even rolling the eyes about in a most striking manner.

In this state the animal may die at once, as in Experiment 21, or respiration may be established again, only to cease shortly after, the animal remaining completely paralysed in the interval, as in Experiment 26; or the animal may recover consciousness but remain paralysed, the respiration gradually ceasing, as in Experiment 23, or after the convulsions he may quite recover and show no symptom whatever, but a greater or less interval having occurred, paralysis begins to be manifest, as in Experiment 24. Even when convulsions are absent marked twitchings of the muscles of the eye or the neck or the hind legs, which completely pass off, may be noticed about five or ten minutes after the bite.

Supposing convulsions to have occurred, the animal will either be found to be completely paralysed, or will ultimately become so. It is occasionally, though by no means universally, noticed that there is a greater loss of power in the hind legs than in the fore, which is probably due to the exhaustion produced by the violent nervous discharges, which are often particularly severe in the hind legs. Respiration directly after the convulsions may be quite absent; it re-commences generally slowly at first, and then becomes very rapid. The pupils are after the convulsions widely dilated, though after a time they may begin to contract again. The respirations, too, ultimately become slower, and the paralysis more profound. Sanious discharges take place from the rectum and other orifices, and finally respiration stops.

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Should convulsions not take place, the history is that of advancing paralysis. The respirations and pulse become very greatly accelerated, and there is gradual loss of power in all the limbs; vomiting may occur. Sanious discharges are observed issuing from the rectum or other parts. The pupils are usually widely dilated, the respirations then become less and less, and may cease with or without convulsions. This is seen in Experiment 18.

But there is a third form of death from daboia-poisoning: it occurs in those cases in which but a very small quantity of daboia poison indeed has been injected. The animal has very few nervous symptoms, very likely none at all; but on the second day he appears ill, refuses food, has diarrhœa, his urine contains albumen, and he may linger on in this state for a few days, dying exhausted, or some acute complication may come on, as in Experiment 20, causing death rapidly.

In birds the symptoms following daboia-bite show no variation. The bird is almost at once seized with convulsions and falls dead. So sensitive are they to the convulsion-producing agent that it is not easy to poison them with daboia poison without producing the convulsions.

Amphibia, on the other hand, do not appear to be susceptible to this influence. Though they are very sensitive indeed to strychnia, daboia poison in them only produces gradual paralysis.

It will be necessary to consider in detail those points in which daboia poison differs in its effects from cobra poison.

Post-mortem Appearances in Cases of Death by Daboia-bite.

The differences in the *post-mortem* appearances of cobra and daboia-poisoning are not numerous. *Rigor mortis* is apt to come on considerably sooner in daboia-poisoning than in cobra-poisoning, especially when the commencing convulsions have been well marked. The blood is almost always found fluid in daboia-poisoning even in the lower animals, the only exceptions being sometimes when the animal dies almost instantaneously in convulsions, as usually occurs in fowls, and when the animal has lingered on for a considerable time, dying ultimately of exhaustion; sometimes in these cases also the blood may show some disposition to coagulate. Effusion of sanious fluid in different parts is extremely common in daboia-poisoning, also extreme injection of the mucous surface of the intestine and staining of its peritoneal surface with blood. The intima, too, is generally well stained.

Local Effects of Daboia-bite.

As to the local mischief caused by the bite of the Daboia Russellii, what has been written regarding the cobra might be repeated here. But there are one or two points of difference which are of sufficient interest to be mentioned. The fangs of the daboia, being so much longer and more formidable than those of the cobra, produce a much larger and deeper wound. From this it happens that it is much more usual to find blood from divided vessels in daboia-bite than in cobra-bite. The local action is also greater, the pain of daboia-bite appearing to be peculiarly severe. The same acute inflammatory effusion as in the case of the cobra can be found in daboia-bite, but it has much more the appearance of blood than that found in cobra-bite, a circumstance that is due to the greater power daboia poison has in causing the contents of the blood-vessels to transude through their walls. However, if a dissection of a daboia-bite be made about three minutes after its infliction, a circle of injected vessels with a pinkish effusion within the meshes of the areolar tissue will be found sufficient to show the real nature of the process that is commencing. The presence, however, of daboia poison imparts, so to speak, a "specific" character to the inflammation in the large amount of blood material in the effusion. The characteristic changes are quite as rapid in occurring as in cobra-bite, if indeed they are not more so, and they are of precisely the same nature, the only difference being in regard to degree. They are invariably followed, should the animal live, with sloughing and suppuration, and are equally valuable as evidence of poisoning with those of cobra-bite.

Action of Daboia Poison on the Nervous System.

Enough has already been said to show that there are considerable differences in the action of daboia and cobra poisons on the nervous system. It remains, therefore, to consider in detail the effect of daboia poison on this portion of the animal system.

Daboia poison, then, commences its action by producing convulsions. It is true that the animal may escape them, through an insufficient quantity of poison being injected. Now, these convulsions in no way depend upon a large quantity of poison being directly injected into a vein, as in cobra-poisoning, nor are they necessarily immediately followed by paralysis and death, being not mere precursors of the extinction of function of the nerve centres; but they may, on the contrary, be for the time perfectly recovered from (see Experiment 24), sometimes an interval of half an hour of perfect health elapsing.

The following experiments show the contrast between the two poisons very well:—

Experiment 33.

One centigramme (·154 grain) of dried daboia poison was dissolved in one cubic centimetre of distilled water, and the solution was injected with great care just beneath the skin of the leg of a fowl.

3.10 P.M.—Injection.

3.11 P.M.—Slightly lame in the leg in which the injection was made.

3.12 P.M.—Violent convulsions.

3.12¾ P.M.—Dead.

Experiment 34.

The same quantity of dried cobra poison, dissolved in the same quantity of water (namely one centigramme in one cubic centimetre) as in the last experiment, was injected just beneath the skin of a leg of a fowl.

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3.30 P.M.—Injection.
3.32 P.M.—Lying down.
3.34 P M.—Drowsy.
3.35 P.M.—Head drooping.
3.36 P.M.—Beak resting on ground, unable to stand; eyelids closed; pupils contracted.
3.37 P.M.—Unable to lift head from ground.
3.40 P.M.—Convulsions; eyes watering.
3.42 P.M.—Dead.

Now, in these two experiments the greatest care was taken to ensure the conditions being exactly the same as regards the amount of poison, the quantity of fluid, and the exact spot into which it was injected; moreover, to avoid accidental sources of fallacy, the experiment was repeated several times, the details, however, of which need not be given here, with the unfailing result that with daboia poison the subject of the experiment died at once in convulsions, while in cobra-poisoning the bird went through the course of gradual paralysis, and after respiration was extinguished had the convulsions of asphyxia and died.

These convulsions, therefore, are in no way due to the injection of the poison into a vein, or to the slight stimulation of nerve centres that is seen in cobra-poisoning immediately before paralysis. The next question is, are these convulsions in any way dependent on asphyxia, like those met with in cobra-poisoning, when the poison has been absorbed in the usual way? If the tracings series No. 7 be examined some evidence on this subject will be obtained. It is a continuous tracing taken from a fowl that died from daboia-poisoning. In the first line no change will be perceived, in the second line the breathing becomes slightly exaggerated, and then instantly, at the spot marked thus (*), the convulsions begin, and do not cease till death. Respiration was perfectly well performed up to the moment of the invasion of the convulsions, which, therefore, could not have been due to asphyxia.

But the following experiment is still more conclusive on this point:—

Experiment 35.

A fowl had its trachea opened and a tube in connection with a bellows for artificial respiration inserted into it. A solution containing two centigrammes (·3 grain) of dried daboia poison was then injected subcutaneously into its leg. Immediately on the injection being completed artificial respiration was commenced.

2.23 P.M.—Injection.
2.23½ P.M.—Artificial respiration begun.
2.26 P.M.—Convulsions, in which the bird died.

Here, though ample means were employed to keep the blood oxygenated, the bird died immediately in convulsions. It is clear, therefore, that these convulsions are *primary*, and in no way due to defective aeration of the blood, like those usual in cobra-poisoning. The convulsions are generally very violent, the muscles usually being powerfully contracted, and then relaxation takes place. Sometimes they may remain tense for some time, but they are commonly clonic. They are very general in character, even to the muscles of the orbit. Sometimes they appear to be tonic, the muscles, as it were, clasping forcibly the frame of the victim.

Dr. Weir Mitchell, in investigating the action of the poison of the crotalus or rattle-snake, describes what he terms a "fremitus," or trembling of the muscular fibrils, dependent upon the contact of the poison with the muscle. The following experiment was made in order to ascertain whether the convulsions were due to this direct action of the poison on the muscles or not:—

Experiment 36.

A fowl was placed under the influence of chloroform and its right crural nerve divided; the left crural nerve was then isolated, and a ligature placed round all the other structures, so as completely to obstruct the circulation, but the nerve was left uninjured. The moment the bird became conscious a small quantity of solution of daboia poison was subcutaneously injected into the tissues at the back of the neck. Almost directly after convulsions occurred; but in these convulsions the muscles supplied by the right, or divided nerve, took no part, remaining perfectly flaccid, while the muscles of the left leg were violently tetanized. Here the muscles of the right leg, which were freely supplied with poisoned blood, but the nerve to which was divided, escaped the convulsions, while those of the left leg which had no contact with the poisoned blood, but whose nerve was still in communication with the central nervous system, took part in them. It is evident, therefore, that the convulsions depend upon the direct irritation of the central nervous system by the poison, and in no way on the contact of the poison with the muscles. It has also been proved that these convulsions do not depend upon paralysis of the respiratory centre, for they may pass off leaving the animal without a symptom (see Experiment 24). Though it is very difficult to poison a fowl with daboia poison without causing primary convulsions, it can with ease be done in the following way:—

Experiment 37.

Five centigrammes (or ·77 grain) of dried daboia poison were dissolved in one cubic centimetre of water and heated for a short time to 100° C. (212° F.). The solution was then cooled and injected subcutaneously into the leg of a fowl.

12.27 P.M.—Injection.
12.34 P.M.—Seems drowsy; eyes closed.
12.45 P.M.—Breathing rapid.
12.47 P.M.—Respiration failing; comb becoming purple.
12.49 P.M.—Lying down; head drooping.
12.50 P.M.—Fallen over on its side; respiration fainter.
12.53 P.M.—Gasping.

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12.56 P.M.—Convulsions.
12.58 P.M.—Convulsions lessening.
12.59 P.M.—Dead.

Here, though the amount of poison injected was more than 15 times that required to cause almost instant death from convulsions, simple exposure to a heat of 100° completely altered the symptoms. They were those of gradual paralysis, which caused the respiration to cease, and the convulsions were evidently simply the expression of carbonic acid poisoning: they were secondary and no longer primary. This subject really belongs to the chemistry of snake-poison, under which it will be considered. It is merely introduced here to show how the paralysis caused by daboia poison without the convulsions can be best demonstrated.

In regard to the paralysis subsequently caused by daboia poison there are one or two points to be observed. It certainly supervenes earlier than in cobra-poisoning, but it does not extinguish the respiratory function nearly so soon. Paraplegia is occasionally noticed in dogs, especially if the hind legs have been much convulsed. Care, however, should be taken not to confound it with inability to use the hind quarters from the pain occasioned by the injection of the poison, which appears to be peculiarly severe. In fact, if the hind legs be never used for poisoning in dogs, paraplegia will be very rarely, indeed, described even in daboia-poisoning.

Again, paralyses of the tongue and larynx, which are such marked symptoms of cobra-poisoning, occur, if at all, in a very modified degree in daboia-poisoning. The tongue, it is true, may be somewhat pendulous during part of the time, but it is usually retracted into the mouth before death, which never happens in cobra-poisoning. Moreover, the larynx does not seem to be paralysed, the dog groaning, screaming, and barking even when his limbs are powerless. It seems as if the poison exerted its influence on the main motor tract and did not possess the marked affinity for certain centres that cobra poison has—a circumstance for which the method in which it commences its action, and the time that it takes to extinguish the respiratory function, might have prepared us.

Action of Daboia Poison on Respiration.

When primary convulsions occur in daboia-poisoning the respirations are of course interrupted. Should death not occur at once, respiration is resumed very slowly at first, then gaining a rapidity beyond normal, to be again diminished and finally extinguished. If convulsions do not occur the rapidity of respiration becomes very marked. The tracings series No. 8 show this very well. They were taken from a fowl poisoned by daboia poison that had previously been heated to 100° C. It will be seen how, not only was there acceleration, but the excursus was increased also. The last line of the tracing shows respiration rapidly failing. But tracing No. IX exhibits better the peculiarities of the respiration in daboia-poisoning. It was taken from a dog in whom the convulsions were represented by only a few irregular muscular contractions. In tracings II and III the very great acceleration due to the daboia poison is to be noticed. It, as a rule, far exceeds the quickening caused by cobra-poisoning, the respirations in I and III being as two to five. No. IV was after the paralysis had become established, and shows a very characteristic condition of the respiration in daboia-poisoning. The respiration has become somewhat slower, but the excursus is increased ; but the peculiarity is that the ordinary respiration is interrupted now and then—it may be once in six to once in 20 inspirations—for a very prolonged and excessive upheaving of the chest walls. This might be considered as simply an occasional cerebral respiration were it not for the very singular accompaniments it sometimes has. If the circumstance be examined when particularly well marked it will be found that first a deep inspiration is taken ; after the diaphragm has descended the muscles of the abdominal wall contract forcibly, and it appears as if the glottis were closed, for after the movement is over a forcible rush of air escapes from it, the legs are drawn up over the abdomen, the perineum is bulged out, and then suddenly relaxation occurs, and the ordinary respiratory rhythm is resumed. As the paralysis becomes more and more marked, this gradually fades into a deep inspiration, and this in its turn is abolished, the respiration becoming slower and slower though the excursus is maintained in a remarkable way.

Daboia-poisoning is characterized, then, by the long time it takes to abolish respiration after the body paralysis is complete, and by the very irregular character of the respiratory movements during the progress of the paralysis, and also by the very great acceleration that occurs in the earlier stages and the increased excursus. The two species of poisoning could be distinguished from one another in the vast majority of cases by the character of the respiration alone. It is very unusual for the convulsions of asphyxia to occur in daboia-poisoning if the primary convulsions have been at all marked.

Effect of Daboia Poison on the Circulation, Temperature, special Senses, Secretion, and the Blood.

In regard to the temperature and circulation it cannot be said that daboia-poisoning differs much from cobra-poisoning. The temperature is but slightly, if at all, raised in ordinary cases of daboia-poisoning, and the circulation can be maintained long after complete paralysis has occurred and the respiration has stopped if the blood be kept oxygenated by artificial means.

On the pupil it seems as if daboia poison had some influence. After the primary convulsions have ceased, the pupil is nearly always, if not always, widely dilated. This dilatation is not dependent on asphyxia, as it is often present when the convulsions are absent. The iris becomes merely a narrow ring, but at the later stages the pupil becomes again contracted, often being smaller than natural. If life is prolonged by artificial respiration the pupil remains somewhat contracted, to dilate again on artificial respiration being discontinued. It would, of course, require direct observation on the human subject to ascertain the effect which daboia poison exerts on accommodation.

Over secretion daboia poison also has some power. Mucous discharges occur from mucous tracts with considerable frequency ; but it is infinitely less powerful in causing salivation than cobra poison. If the experiments given at the commencement of this section be looked at, in not one is salivation

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recorded. If the elaborate series of experiments in the "Thanatophidia" be examined, it will be seen that in not a single experiment with daboia poison is the word "salivation" used, whereas it is constantly employed in describing cases of cobra-poisoning. In some cases of daboia-poisoning given in the "Thanatophidia," however, in which convulsions took place, the word "frothing" is used, but it is never mentioned in these cases that "salivation" occurred. Now, on reference to the "Thanatophidia," it will be found that this "frothing" only occurred in dogs, with one exception, in whom the primary convulsions were well marked, and in these cases it is described as following immediately on the convulsions, and was never succeeded by salivation. If it had been salivation there can be no doubt but that that word would have been employed to describe it; so it is extremely probable that it was simply the fluid in the mouth churned into foam by the rapid passage of air to and fro in the convulsions, precisely as occurs in symptomatic convulsions in the human subject.

In the one exception alluded to above, directly after the bite was inflicted a fluid remedy was forcibly administered, the dog struggling very much—a fact that would easily account for frothing at the mouth without salivation. In none of the other cases in the "Thanatophidia" is either frothing or salivation given as a symptom of daboia-poisoning. In only one other published case, moreover, that I am aware of, is salivation given as occurring in daboia-poisoning, and an objection of considerable weight might be raised against this case. I am, however, satisfied that it does sometimes occur, having seen it once in a very slight degree. But it is so rare that it cannot be considered as anything but very exceptional; and it will not be going too far to say that in dogs it is as rare to see salivation in daboia-poisoning as it is to see it absent in cobra-poisoning.

In daboia-poisoning there is a good deal of evidence to be considered as to the effect of the poison on the blood. It is almost universally found that the blood is incoagulable; the only exceptions, as far as I am aware, being when an animal dies almost instantaneously from the convulsions, and also when it dies after a very long interval from exhaustion. The first condition is often found in fowls, and the second in robust animals which have had only a small quantity of poison administered to them. In the first class of cases it is probable that sufficient time has not elapsed for blood changes to occur; in the second the blood has had time to a certain extent to regain its normal character, for in these cases the coagulation is somewhat imperfect. In addition to the loss of coagulability of the blood, even in the lower animals, we have proof that the relation of the blood to the tissues is altered. Even in rapid cases of daboia-poisoning hœmorrhages from the mucous membranes are exceedingly common (see Experiments). Exudations of blood beneath the conjunctiva and mucous membrane of the mouth are also sometimes seen. So grave are the changes in the blood, that it is not unusual for an animal to die of the consequences of them alone without a single nerve symptom having occurred. Thus in Experiment 20 the animal had no symptom till the respirations began to increase in frequency, nor did the animal show any muscular weakness then; the only evidence that there was of any other abnormal condition being copious discharges of sanious fluid from the mouth and rectum. The sole cause of death was undoubtedly œdema of the pulmonary tissue, and the antecedent condition to this must have been simply the altered condition of the blood. But it is easy to collect plenty of cases of death from blood change in daboia-poisoning.

Experiment 38.

A cat had one cubic centimetre of a solution of daboia poison containing about five milligrammes of the poison injected into its leg subcutaneously.

3.3 P.M.—Injection.
3.16 P.M.—Seems in some pain.
3.37 P.M.—Respiration somewhat rapid.
7 P.M.—Seems pretty well.
6 A.M.—Ill; vomiting.
1 P.M.—Crouches down, disinclined to be disturbed.
7 P.M.—Refuses food.

This animal lived for four days, being severely ill, all the time refusing food, having diarrhœa, and at last it died of exhaustion. The blood was found to be feebly coagulated after death.

Experiment 39.

A solution of about five milligrammes of daboia poison was injected into a dog.

4 P.M.—Injection.
7 P.M.—No symptom.
8 A.M.—No change.
4 P.M.—As no symptom appeared, five milligrammes more of daboia poison were injected.
7 P.M.—No change.
9.30. P.M.—Affected; respirations 50; pupils widely dilated.
6 A.M.—Still seems ill, but can stand.
2 P.M.—Depressed and ill.
3 P.M.—Passed some albuminous urine.
9 P.M.—Not much change; diarrhœa.
6 A.M.—Still very ill.
12 P.M.—Urine albuminous; seems very ill.

As it was clear that the animal would die a lingering death, as in the last experiment, some more daboia poison was injected to shorten life.

1.30 P.M.—Injection.
3.9 P.M.—Passed a sanious motion.
3.17 P.M.—Cannot stand.
3.20 P.M.—Respiration failing.
3.29 P.M.—Dead.

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These were two cases of severe blood-poisoning, which occurred almost completely without accompanying nerve symptoms, one of which was fatal, and the other undoubtedly would have been had the case been allowed to run its course.

In cobra-poisoning pure and simple albuminuria is unknown, but in every case of daboia-poisoning, in which symptoms were present and in which six hours elapsed before death, I have detected albumen in the urine. It is generally not in very large quantity, but is still unmistakable. Care should be taken not to allow the urine secreted before the commencement of the symptoms to mix with that secreted after.

There is evidence, therefore, that daboia venom is a most severe blood-poison, producing death when not administered in sufficient quantities to cause serious nerve symptoms, and that it is even possible for death to occur quite early from this cause alone, nerve symptoms not having supervened. In fact, when the time for nerve effects has quite passed, there remains a period of blood-poisoning nearly as fatal to life as the nerve symptoms themselves.

Summary of the Differences of the Effects of Daboia and Cobra Poison.

Although it would be premature to draw up a list of all the differences of these snake poisons from one another till the other aspects of the subject have been considered, especially with regard to the nature of the poisons of their congeners, yet, on account of the importance of the subject, it will be useful to note shortly the chief differences that have been detected between them.

Cobra poison, when introduced slowly into the circulation, produces gradual general paralysis, but at the same time shows a preference for certain nerve centres, paralysis of the tongue, lips, and larynx being very marked symptoms, and respiration is very quickly extinguished after the paralysis shows itself. Death is often attended by convulsions, which are clearly due to carbonic acid poisoning.

Introduced with a fair amount of rapidity, these symptoms are rapidly developed, the paralysis being preceded by gentle stimulation, which causes slight muscular twitchings.

Injected in a large quantity into the circulation, the stimulation is so violent as to cause general convulsions, of which, however, the respiratory muscles have the chief share, and which are immediately followed by paralysis and death.

Daboia poison, though not injected directly into the circulation, can cause directly the most violent convulsions, which are in no way necessarily followed by immediate paralysis and death, but may be for the time completely recovered from. They do not depend on carbonic acid poisoning. The paralysis that succeeds is general, and lasts a very considerable time before respiration is extinguished. There is no evidence of the tongue, lips, and larynx being especially paralysed; they probably only suffer in the same degree as the other parts.

Cobra poison very quickly destroys the respiratory function: after slight acceleration the respiration becomes slower, and the excursus is lessened.

Daboia poison at first quickens the respiration very much more than cobra poison does, and the lessening of the excursus and the slowing of the breathing do not occur so soon. The respiration generally in daboia-poisoning has a peculiarly irregular character. This function certainly exists longer under the influence of daboia poison than under that of cobra poison.

The effect of cobra poison on the pupil is so slight as to be a matter of doubt; daboia poison nearly always causes wide dilatation in the earlier stages of the poisoning. Salivation is a constant symptom of cobra-poisoning; it is exceedingly rare in daboia-poisoning.

The effect of cobra poison on the blood is not very great, sanious discharges are rare, albuminuria has not been seen, and recovery is striking and complete.

In daboia-poisoning, on the other hand, sanious discharges are the rule, albuminuria is usual should the victim live any time, and after the nerve symptoms pass over the subject has to go through a period of blood-poisoning, little, if at all, less dangerous than the primary symptoms.

We have, in addition, the greater local mischief caused by daboia poison, and the greater power it has of destroying the coagulability of the blood.

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REPORT

ON

SANITARY MEASURES IN INDIA IN 1876-77:

TOGETHER WITH

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